CALIBRATION AND SERVICING HANDBOOK

1065

datron

digital multimeter

CALIBRATION AND SERVICING HANDBOOK

for

THE DATRON AUTOCAL 1065 DIGITAL VOLTMETER

(for operating procedures refer to the User's Handbook)

850047 Issue 2 (DEC. 80)

For any assistance contact your nearest Datron Sales and Service office.
Addresses can be found at the back of this handbook.

Due to our policy of continuously updating our products, this handbook may contain minor differences in specification, components and circuit design to the instrument actually supplied. Amendment sheets precisely matched to your instrument serial number are available on request.

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SECTION 1

CALIBRATION

1.1 INTRODUCTION

1.1.1 General

The purpose of calibration is to take account of any long-term drifts in the components of the instrument and to restore the accuracy, traceable to a known standard.

The period between calibrations depends upon the accuracy performance required from the instrument and for guidance, guaranteed accuracies for 24 hours, 90 days and 1 year are quoted.

The calibration procedures presented in the following pages should cater for most calibration situations. If, however, a special problem arises, please contact our Customer Service Section.

1.1.2 The Essentials for Good Calibration

Temperature - So that the instrument can meet its specification over the quoted temperature range, the temperature environment should be stabilised at 23°C ± 1°C. In addition, temperature gradients around the instrument should be considered, therefore calibrate the instrument in its normal operating position and allow plenty of room for ventilation.

Warm up - It is essential that the instrument has fully temperature stabilised if the best results from calibration are to be achieved. Therefore, at least a 2 hour warm-up period is recommended during which time the line supply or the covers should not be removed even for a short period. In addition, if the covers have been removed, make certain that they are correctly fitted and that the leaf contacts to the Earth and Guard Shields are in good shape.

Calibration Source - To perform a useful calibration the accuracy of the source should always be at least four times that of the instrument being calibrated. In most cases, examples of likely sources are given for each calibration function.

With some calibration sources, the output may take several seconds to settle to a final value, therefore unless a shorter settling time is assured, a period of 10 seconds is recommended before each calibration operation.

Guarding - It is preferable to arrange for the DVM to be calibrated with 'Guard' connected to 'Lo' at the DVM. Furthermore to arrange for the 'Lo' terminal of the DVM to remain at 'earth' throughout and let the calibration source float. If the front panel input terminals are used then 'Guard' is permanently connected to 'Lo' internally. If 'Rear' panel input is selected then 'Guard' can either be connected locally or remotely. If a remote guard connection is desirable then examples are shown in the User's Handbook.

1.1.3 The 'AUTOCAL' Process

1.1.3.1 General

The Datron 'AUTOCAL' process means that complete calibration of AC, DC and Ohms on every range can be carried out from the instruments own front panel. In the process, an internal non-volatile memory stores calibration constants for each function and range as determined when the instrument takes a series of 16 readings of the applied calibration source. Internally, each of the readings is deviated by one sixteenth of a digit and when an average is taken, the instrument is able to resolve to better than one least significant digit displayed.

Access to the non-volatile memory is gained using a key inserted into the rear panel. When calibration is complete, the key is removed, therefore preventing accidental or unauthorised use of the calibration routine.

1.1.3.2 Procedure Outline

- Select the 'FUNCTION' and 'RANGE' to be calibrated and cancel any 'MODE' keys.

- If the instrument is to be manually calibrated, set the rear panel address switch to 31, i.e. all 1's.

- Insert the key into the 'CALIBRATE ENABLE' keyswitch on the rear panel and turn to the 'CAL' position. (The 'Cal' legend will be displayed on the front panel and the operation of the keys in the 'MODE' group changes to that indicated above the keys).

- Connect the calibration source to the input terminals and operate the keys shown in the tables in the following pages. When a calibration key in the 'MODE' group is operated, its associated L.E.D. indication will light and extinguish when the calibration operation is executed.

- When all calibration is complete, turn the keyswitch to 'RUN' and remove the key.

1.1.3.3 The Five Calibration Keys

When the instrument is in the calibration mode of operation, as described in the procedure outlined above, the five keys in the front panel 'MODE' group operate as labelled above the keys.

'Zero' - This takes account of offsets in the instrument and in the calibration source.

'Gain' - This sets a scaling factor for each range and function.

'AcHf' - This flattens the response of the A.C. amplifier used for AC voltage measurement. It should only be used when a full calibration i.e. 'Zero', 'Gain' and 'AcHf' is carried out. The calibration action is iterative and requires several operations of the key to complete.

'Lin' - This is an important calibration operation as it optimises the basic linearity of the internal measurement circuitry used for all ranges and functions. It must be used before any DC voltage or Ohms calibration is carried out.

'Keyboard' - This is an extension of the 'AUTOCAL' process which is useful when using a calibration source set to a nominal value but with known errors. This means for example that calibration directly to a standard cell is possible. A full explanation of the procedure is covered in section 1.5.

1.1.3.5 'AUTOCAL' over the Bus

Each of the five calibration operations can be controlled using the IEEE bus. This means that the instrument can be entirely calibrated remotely or under program control. As mentioned in the 'Procedure Outline' for a manual calibration, the rear panel address switch should be set to 31, i.e. all 1's. When a bus calibration is required the address switch must be set to the address number assigned to the DVM in the system. More details of calibration with the bus are included in section 1.6.

1.1.3.6 'Err 4'

If during calibration 'Err 4' is displayed, this indicates that the Calibration Source deviates too far from the calibration span of the instrument. Under these circumstances, the calibration memory is not updated and the calibration key LED remains on.

In the case of 'Zero', 'Gain' or 'AcHf' the Calibration Source should be checked and the same Calibration key repressed. If 'Err 4' follows 'Lin' or persistently appears following 'Zero', 'Gain' or 'AcHf' then an instrument failure may have occurred. Therefore either consult our Customer Service Section or the Servicing Section of this Handbook.

1.2 DC VOLTAGE CALIBRATION

1.2.1 General

The procedure in the table opposite is all that is necessary to completely 'AUTOCAL' the DC voltage function. Steps 1 and 2 affect the accuracy on all ranges and should therefore be carried out even if just one range is being calibrated.

On each range a 'Zero' and 'Gain' calibration is required for each polarity of input. The two 'Zero' calibrations are included to overcome a possible zero difference with the polarity setting of the DC calibration source.

If the 'DVM Reading After Calibration' is not in accordance with the table, repeat operations of the same Calibrate key are permissible. Where no tolerance is shown in this column, only the exact reading quoted with an occasional least significant digit showing is to be expected.

1.2.2 Equipment Required

- A copper shorting link.

- A DC Calibration Source. e.g.— Fluke 332D with a 100:1 (5ppm) divider for producing a 100mV source.

1.2.3 Checking Accuracy after 'AUTOCAL'

To check the accuracy after 'AUTOCAL' the 'Specification Verification' section of the User's Handbook will be useful; it provides tables for quick reference of accuracy on all ranges and functions in displayed digits.

DC VOLTAGE CALIBRATION

Step	Calibration Operation	Calibration Source Output	DVM Setting	Calibrate Key	DVM Reading After Calibration	Remarks
1	Linearity	Copper shorting link	DC,10	'Lin'	<10 digits	This calibration step may take around 30 seconds to complete
2	10V Range Zero	+0.0000V	DC,10	'Zero'	±0.0000V	
3	10V Positive Full Range	+10.0000V	DC,10	'Gain'	+10.0000V	
4	10V Range Zero	−0.0000V	DC,10	'Zero'	±0.0000V	
5	10V Negative Full Range	−10.0000V	DC,10	'Gain'	−10.0000V	
6	1V Range Zero	+0.00000V	DC,1	'Zero'	±.00000V	
7	1V Positive Full Range	+1.00000V	DC,1	'Gain'	+1.00000V	
8	1V Range Zero	−0.00000V	DC,1	'Zero'	±.00000V	
9	1V Negative Full Range	−1.00000V	DC,1	'Gain'	−1.00000V	
10	.1V Range Zero	+0.000mV	DC,.1	'Zero'	±0.000mV ±1 digit	Wait for the reading to stabilize before operating 'Zero'
11	.1V Positive Full Range	+100.000mV	DC,.1	'Gain'	+100.000V ±1 digit	
12	.1V Range Zero	−0.000mV	DC,.1	'Zero'	±0.000mV ±1 digit	Wait for the reading to stabilize before operating 'Zero'
13	.1V Negative Full Range	−100.000mV	DC,.1	'Gain'	−100.000V ±1 digit	
14	100V Range Zero	+0.000V	DC,100	'Zero'	±0.000V	
15	100V Positive Full Range	+100.000V	DC,100	'Gain'	+100.000V	
16	100V Range Zero	−0.000V	DC,100	'Zero'	±0.000V	
17	100V Negative Full Range	−100.000V	DC,100	'Gain'	−100.000V	
18	1000V Range Zero	+0.00V	DC,1000	'Zero'	±0.00V	
19	1000V Positive Full Range	+1000.00V	DC,1000	'Gain'	+1000.00V	ϟ Lethal voltages present - increase calibration source in 100V steps if possible
20	1000V Range Zero	−0.00V	DC,1000	'Zero'	±0.00V	
21	1000V Negative Full Range	−1000.00V	DC,1000	'Gain'	−1000.00V	ϟ Lethal voltages present - increase calibration source in 100V steps if possible

1.3 OHMS CALIBRATION

1.3.1 General

The procedure in the table opposite is all that is necessary to completely 'AUTOCAL' the Ohms function. If just the Ohms or just one range of the Ohms is to be calibrated, then step 1 in the DC Voltage Calibration table should be carried out first. Then on each Ohms range just a 'Zero' and 'Gain' calibration is required.

If the 'DVM Reading After Calibration' is not in accordance with the table, repeat operations of the same Calibration key is permissible to improve the reading. Where no tolerance is shown in this column, only the exact reading quoted with an occasional least significant digit showing is to be expected.

1.3.2 'Zero Resistance Source

For accurate 'Zero' calibration on Ohms it is ESSENTIAL that a correctly connected zero source is used.

Figures 1.1 and 1.2 show the connections for front and rear panel input respectively. It can be seen that two arrangements are necessary depending upon the value of the standard Resistor source being used.

It should be noted that a 4 wire connection is recommended throughout.

1.3.3 Equipment Required

A set of resistance standards from 100Ω to 10MΩ in decades; it is essential that 100Ω to 100kΩ standards are 4 terminal devices.

1.3.4 Checking Accuracy after 'AUTOCAL'

To check the accuracy after 'AUTOCAL' the 'Specification Verification' section of the Operating Handbook will be useful. It provides tables for quick reference of accuracy on all ranges and functions in displayed digits.

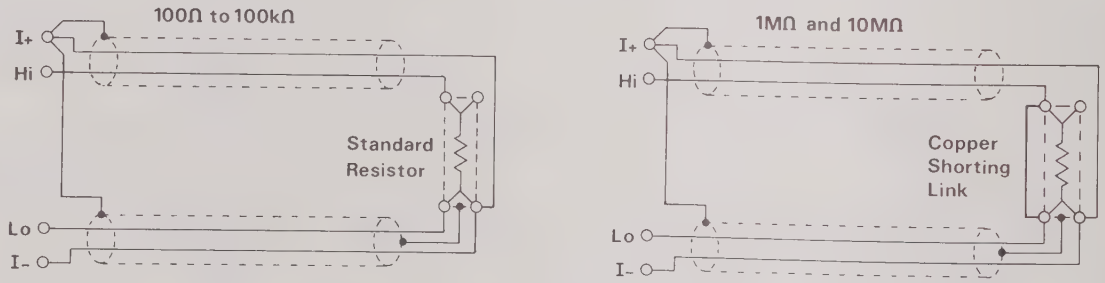


Fig.1.1 ZERO RESISTANCE SOURCE CONNECTIONS USING FRONT PANEL INPUT

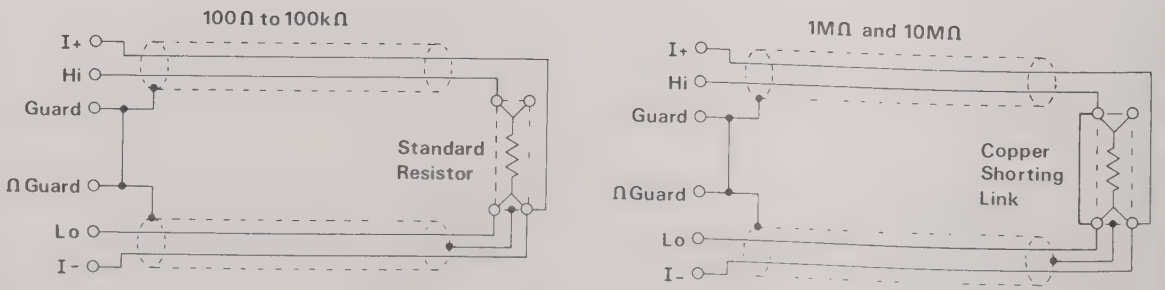


Fig.1.2 ZERO RESISTANCE SOURCE CONNECTIONS USING REAR PANEL INPUT

OHMS CALIBRATION TABLE

Step	Calibration Operation	Calibration Source	DVM Setting	Calibrate Key	DVM Reading After Calibration	Remarks
1	.1kΩ Range Zero	4 wire zero	kΩ, .1	'Zero'	±0.000Ω	Wait for the reading to stabilize before operating 'Zero'
2	.1kΩ Full Range	100Ω [1] Standard Resistor	kΩ, .1	'Gain'	100.000Ω	Wait for the reading to stabilize before operating 'Gain'
3	1kΩ Range Zero	4 wire zero	kΩ, 1	'Zero'	±.00000kΩ	
4	1kΩ Full Range	1kΩ [1] Standard Resistor	kΩ, 1	'Gain'	1.00000kΩ	
5	10kΩ Range Zero	4 wire zero	kΩ, 10	'Zero'	±0.0000kΩ	
6	10kΩ Full Range	10kΩ [1] Standard Resistor	kΩ, 10	'Gain'	10.0000kΩ	
7	100kΩ Range Zero	4 wire zero	kΩ, 100	'Zero'	±0.000kΩ	
8	100kΩ Full Range	100kΩ [1] Standard Resistor	kΩ, 100	'Gain'	100.000kΩ	
9	1000kΩ Range Zero	4 wire zero	kΩ, 1000, Filter	'Zero'	±0.00kΩ	
10	1000kΩ Full Range	1000kΩ [1] Standard Resistor	kΩ, 1000, Filter	'Gain'	1000.00kΩ ±1 digit	
11	10MΩ Range Zero	4 wire zero	kΩ, 10MΩ, Filter	'Zero'	±0.0000MΩ	
12	10MΩ Full Range	10MΩ [1] Standard Resistor	kΩ, 10MΩ, Filter	'Gain'	10.0000MΩ ±5 digits	

[1] - With Standard Resistor sources it may be useful to use the 'Keyboard' method of calibration - see section 1.5

1.4 AC VOLTAGE CALIBRATION

1.4.1 General

The procedure in the table opposite is all that is necessary to completely 'AUTOCAL' the AC voltage function. On each range just a 'Zero', 'Gain' and 'AcHf' calibration is required.

If the 'DVM Reading After Calibration' is not in accordance with the table, repeat operation of the same Calibration key is permissible to improve the readings. This will be necessary with the AcHf key.

1.4.2 Equipment Required

A copper shorting link and an AC calibration source e.g. Fluke 5200A and 5215A.

1.4.3 Checking Accuracy after 'AUTOCAL'

To check the accuracy after 'AUTOCAL' the 'Specification Verification' section of the User's Handbook will be useful. It provides tables for quick reference of accuracy on all ranges and functions in displayed digits.

AC VOLTAGE CALIBRATION TABLE

Step	Calibration Operation	Calibration Source Output	DVM Setting	Calibrate Key	DVM Reading After Calibration	Remarks
1	1V Range Zero	Copper shorting link	AC,1	'Zero'	.00000V ±1 digit	Do not select 'Filter'. Wait for reading to stabilize before operating 'Zero'
2	10V Range Zero	Copper shorting link	AC,10	'Zero'	0.0000V ±1 digit	
3	100V Range Zero	Copper shorting link	AC,100	'Zero'	0.000V ±1 digit	
4	1000V Range Zero	Copper shorting link	AC,1000	'Zero'	0.00V ±1 digit	
5	10V Full Range LF	10V rms 500 Hz	AC,10, Filter	'Gain'	10.0000V ±1 digit	Select 'Filter for remaining steps
6	10V Full Range HF	10V rms 30 kHz	AC,10, Filter	'AcHf'	10.0000V ±10 digits	
7	1V Full Range LF	1V rms 500Hz	AC,1, Filter	'Gain'	1.00000V ±1 digit	
8	1V Full Range HF	1V rms 30 kHz	AC,1, Filter	'AcHf'	1.00000V ±10 digits	
9	100V Full Range LF	100V rms 500 Hz	AC,100, Filter	'Gain'	100.000V ±1 digit	
10	100V Full Range HF	100V rms 30 kHz	AC,100, Filter	'AcHf'	100.000V ±10 digits	
11	1000V Full Range LF	1000V rms 500 Hz	AC,1000, Filter	'Gain'	1000.00V ±1 digit	Lethal voltage present - increase calibration source in 100V steps if possible
12	1000V Full Range HF	1000V rms 10 kHz	AC,1000, Filter	'AcHf'	1000.00V ±20 digits	Lethal voltage present - increase calibration source in 100V steps if possible. DO NOT EXCEED 25 kHz

1.5 CALIBRATION USING 'Keyboard'

1.5.1 General

The 'Keyboard' method of calibration is useful when a calibration source although set to a nominal value has known errors. In this situation the known value of the calibration source can be entered into the DVM before the 'AUTOCAL' process is executed. The process is functional during any calibration with a source of magnitude between 20% and 200% of the range selected, but it should be noted that for equal magnitude source errors, calibrating at the lower percentage end of range produces a higher percentage calibration error. The 'Keyboard' method operates for both the 'Gain' and AcHf' calibration operations. An example using 'Keyboard' to calibrate directly against a Standard Cell is shown in the table below.

When 'Keyboard' is selected the operation of the 'RANGE', 'INPUT' and 'FUNCTION' keys changes to the numeric, decimal point, polarity and clear labels shown on the front of the instrument.

1.5.2 'Keyboard' with Negative Inputs

If the 'KEYBOARD' method is used on DC Voltage calibration with Negative polarity sources, it is important NOT to enter a negative sign with the keyed-in source value. The instrument itself can determine the polarity of the source and update the appropriate calibration memory location.

CALIBRATION EXAMPLE USING 'KEYBOARD'

Step	Calibration Operation	Calibration Source Setting	DVM Setting	Calibrate Key	DVM Reading After Calibration	Remarks
1	1V Range Zero	Short-circuit	DC,1	'Zero'	±.00000V	Short connecting leads at Standard Cell end
2	Connect Standard Cell	Standard Cell	'Keyboard'	–	0	
3	Enter Standard Cell Voltage	Standard Cell	1,˙,0,1,8,1,6	–	+1.01816	
4	1V Range Calibration	Standard Cell	–	'Gain'	+1.01816	

1.6 'AUTOCAL' OVER THE BUS

All the calibration procedures covered in this handbook can be carried out remotely using the IEEE Bus.

Effectively, the five calibration keys are replaced by five Bus instructions and these are used instead of the Calibration keys listed in the Calibration tables on previous pages.

An example of calibration with the Bus is given in the table below. A complete program listing for the same calibration operation assuming an HP9825 controller is as follows:—

```
Ø: dim D$[15]          define 15 character string
                       variable
1:  clr 728            send 'device clear' to DVM
                       (interface 7, address 28)
2: wrt 728,"F3R3Q1W1="  program to DC 1V, SRQ
                       Mode 1, Enable Cal.
3: Ø→S
4: wrt 728,"GØ="       program zero cal. trigger
```

CALIBRATION EXAMPLE USING THE BUS

Step	Calibration Operation	Calibration Source	DVM Setting	Bus Controller Instruction	DVM Reading After Calibration	Remarks
1	Set DVM to known state	–	In Remote State	'Device Clear'	–	Program DVM to predetermined state C0DXE0F3N0 O0O0RS0T1
2	Set DVM to DCV, 1V Range, and prepare for calibration	+0.00000V	Calibration key to 'CAL'	'F3R3Q1W1='	–	Program DVM to Function: DC V (F3) Range: 1V (R3) SRQ Mode 1 (Q1) Enable Cal. (W1)
3	1V Range Zero	+0.00000V	In Remote State	'GØ='	±.00000V	Program 'Zero' cal., SRQ indicates when calibration operation completed
4	1V Positive Full Range	+1.00000V	In Remote State	'G1='	+1.00000V	Program 'Gain' cal., SRQ indicates when calibration operation completed
5	Set DVM to Internal Trigger, Disable Cal.	–	In Remote State	'TØWØ='	–	Program DVM to Internal Trigger (TØ), Disable Cal. (WØ)
6	–	–	In Local State, Calibration key to 'RUN'	'Local'	–	DVM in normal mode, free-running

SECTION 2

MECHANICAL DESCRIPTION

2.1 GENERAL

The 1065 has been designed to be either rack mounted in a standard 19" rack (3½" (2U) height required) or bench top/portable with integral tilt stand. An exploded view of the instrument is shown in Fig. 2.1.

2.2 FRONT PANEL

The front panel incorporates the signal input terminals, input, function, mode and power switches and a numeric/legend gas discharge display.

2.3 REAR PANEL

The rear panel incorporates the power cable input plug and fuse, the IEEE Bus connector and address selection switch, the rear signal input plug, the run/calibrate key-switch and the calibration interval select switch.

2.4 EXTERNAL CONSTRUCTION

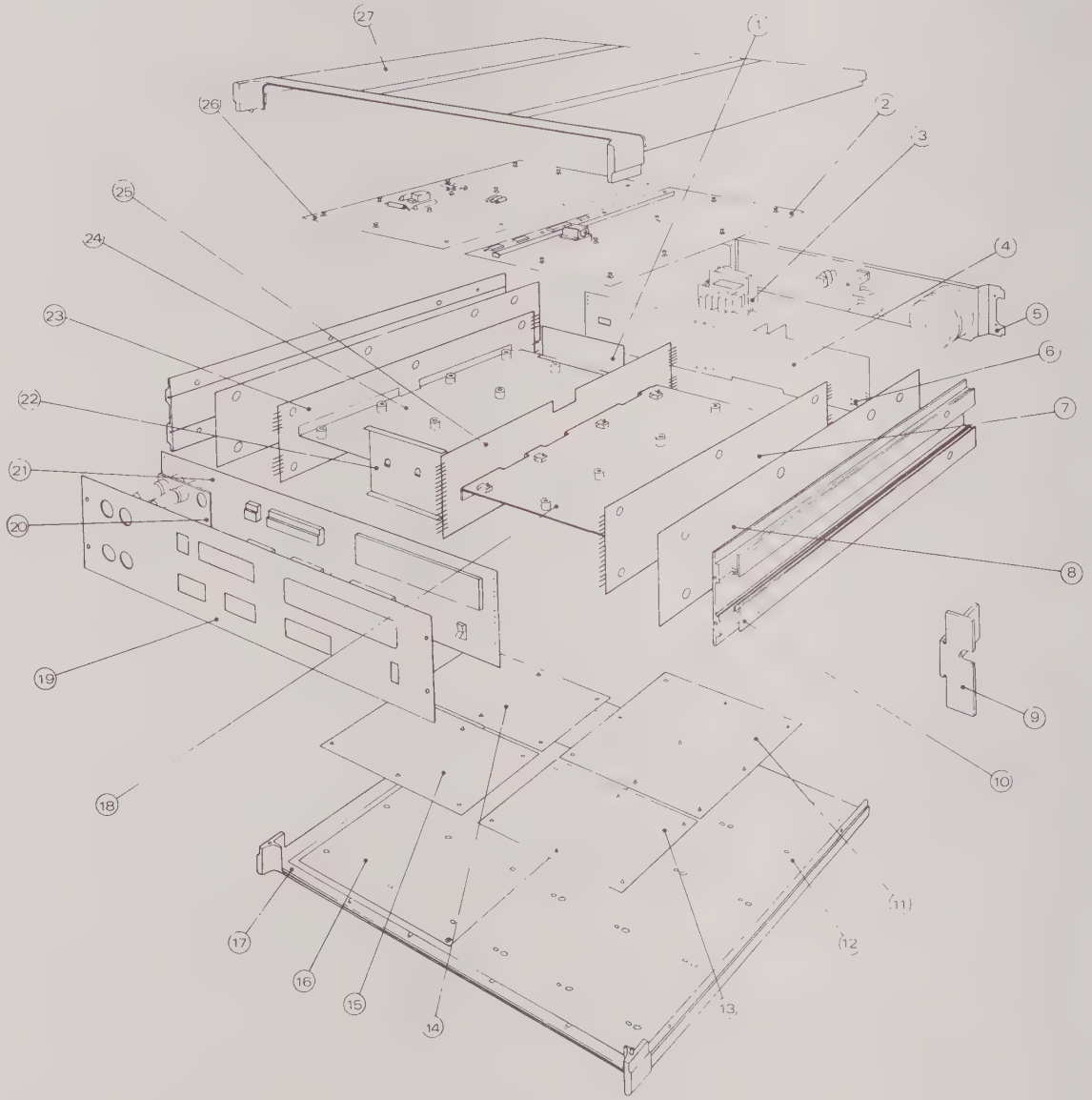
An overlay adheres to the front panel, it labels the keys and retains a polarising filter in front of the display. Both the front and rear panels are held together by two side extrusions running from front to rear. These provide slots for the rack mounting 'ears' and locating points for the structural foam covers. The bottom cover is fitted with a tilt-stand and rubber feet. Earth screening of the covers and guarding is provided by aluminium plates, heat-staked to the inside of the covers with electrical connections made by spring contacts.

2.5 INTERNAL CONSTRUCTION

An internal chassis is constructed from four printed circuit boards, held together by connectors at each corner and held rigid by two inner aluminium shields fixed horizontally on the instrument's centre line running from front to rear. Input terminals, switches and display are mounted on the front printed circuit board (pcb) and the power supply on the rear pcb. The side and centre pcb's are used for interconnections between the main circuit boards.

All the main circuit boards are mounted on the inner shields with hinges and quick release fasteners with flexible connections to allow operation in the 'hinged-up' position.

The chassis is mounted on to the side extrusions with nylon screws, spacers and an insulation sheet to ensure that the 'electrical spacings' of the BSI, UL and VDE specifications are achieved.



1. REAR GUARD SCREEN
2. DIGITAL ASSEMBLY
3. REAR INPUT ASSEMBLY
4. REAR (POWER SUPPLY) PCB ASSEMBLY
5. REAR PANEL ASSEMBLY
6. POWER SUPPLY VOLTAGE SELECTION LINKS
7. R.H. PCB ASSEMBLY
8. INSULATION SHEET
9. RACK MOUNTING BRACKET
10. SIDE EXTRUSION
11. DIGITAL INTERFACE ASSEMBLY
12. EARTH SCREEN
13. DISPLAY DRIVER ASSEMBLY
14. AC ASSEMBLY
15. OHMS ASSEMBLY
16. OUTER GUARD SCREEN
17. BOTTOM COVER ASSEMBLY
18. R.H. CENTRE GUARD SCREEN
19. FRONT PANEL AND OVERLAY
20. TERMINAL SUPPORT PLATE
21. FRONT PCB ASSEMBLY
22. FRONT GUARD SCREEN
23. L.H. PCB ASSEMBLY
24. L.H. CENTRE GUARD ASSEMBLY
25. CENTRE PCB ASSEMBLY
26. ANALOG ASSEMBLY
27. TOP COVER ASSEMBLY

FIG. 2.1 EXPLODED VIEW OF INSTRUMENT

SECTION 3

TECHNICAL DESCRIPTION

3.1 INTRODUCTION

The internal circuits of the instrument are built onto eight printed circuit board assemblies shown in Fig. 3.1.

Each of these assemblies will be described in turn by subdividing the circuit into separate blocks with a detailed explanation. This should assist servicing to component level.

3.2 DC ANALOG ASSEMBLY (Circuit Drawing No. 430421)

The DC Analog assembly is split into three distinct sections: (i) the Analog Interface, (ii) the DC Isolator and (iii) the Analog to Digital (A - D) Converter.

The Analog Interface receives data from the Digital assembly to control the selection of function, range and other features of the analog circuitry. Messages between the Analog and Digital assemblies are passed via opto-isolators, electrically isolating one from the other.

The DC Isolator includes the preamplifier, range scaling circuits and bootstrapped supplies. The A - D section converts the scaled input signal to a time period proportional to the signal using a modified triple slope technique.

3.2.1 Analog Interface (430421 sheet 5)

3.2.1.1 Introduction

The Analog Interface provides electrical isolation between the Digital and Analog circuitry. Latched data from the microprocessor is passed through opto-isolators, decoded and latched again on an analog assembly to select function, range, test, average and the D - A converter set up conditions.

3.2.1.2 Power-On

At power-on the A - D converter is placed into the RESET condition (See Section 3.2.3.8). The analog circuitry is placed into the DC, 1000V range until another range or function is selected (See Fig. 3.3).

In the description which follows (ID) is used to describe an Analog Interface Data line signal which drives the opto-isolators from the digital assembly. (IA) describes an Analog Interface Address line signal.

For both ID and IA:

logic '1' ≡ + 5 volts
logic '0' ≡ 0 volts

Firstly, all assemblies are deselected by placing logic '1's on all the ID lines, then setting the IAØ and IA1 lines low (see Fig. 3.4), clocking the function select latches (M20 Analog assembly, M5 AC assembly, M9 Ohms assembly, M1 Rear assembly from M17-3). Both IA lines then return high. Secondly, the latches of the D - A converter (M13, M14) are reset. The ID lines are set to logic '0' and clocked on to M13 and M14 by a delayed low to high edge from M17-4, originating from IAØ going low. The delay makes sure that the signal from M17-10 has disabled the "F.E.T." latch M21. Once again, the IAØ line returns to the resting state of logic '1'. Thirdly, the DC analog circuits are enabled by setting all the ID lines except for ID0, then clocking M20 by a low to high edge from M16-6 caused by both IA lines going low. Once DC has been selected, the F.E.T. pattern latch is enabled from M12-1, and the penultimate step is to load this latch with 1000V range data from the ID lines (ID4 low, the rest high). This is executed by clocking the 'F.E.T.' latch from M17-4 once again, but this time being due to IA1 going low. The final step is to reselect DC as described above.

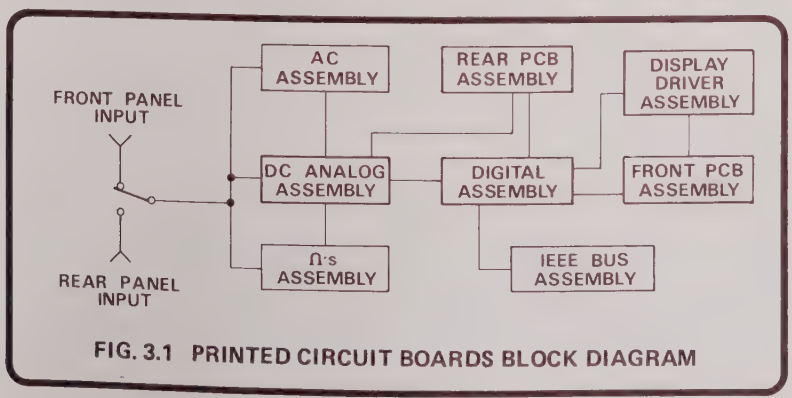


FIG. 3.1 PRINTED CIRCUIT BOARDS BLOCK DIAGRAM

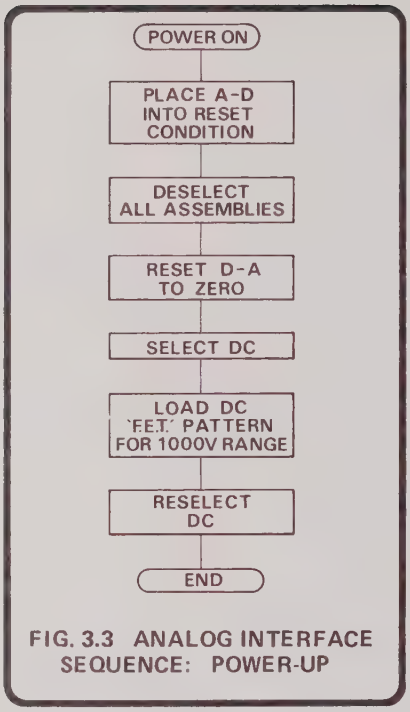


FIG. 3.3 ANALOG INTERFACE SEQUENCE: POWER-UP

3.2.1.3 General Interface Update Sequence

Before the start of each reading, the analog interface undergoes a complete update. The series of events is the same as the power-up sequence for selection of function and range, as can be seen by comparing the two flowcharts (Figs. 3.3 and 3.5). When Ohms is selected, the DC Isolator is also used in the measurement procedure as seen in the following table.

Type of Measurement	Circuits Selected	Use of D - A
DC Volts	Analog Assembly	Not used
AC Volts	AC Assembly	Frequency Compensation
AC + DC Volts	AC Assembly	Frequency Compensation
Resistance	Ohms Assembly and Analog Assembly	Not used

The update sequence order is (i) Deselect all assemblies, (ii) Load D - A latches, (iii) Select AC assembly or DC Isolator, (iv) Load range pattern into DC or AC range latches, (v) Deselect DC or AC and select the Ohms assembly, (vi) Load range pattern into Ω's latch, (vii) Reselect circuits selected in (iii) and (iv).

Note: Steps (v) and (vi) are used only when Ω's is selected.

Flowchart 3.5 gives the above sequence for an ohms update. The general form of the timing diagram for the above sequence is given in Fig. 3.6, the analog 'F.E.T.' patterns for each range of each function being given in Appendix 1.

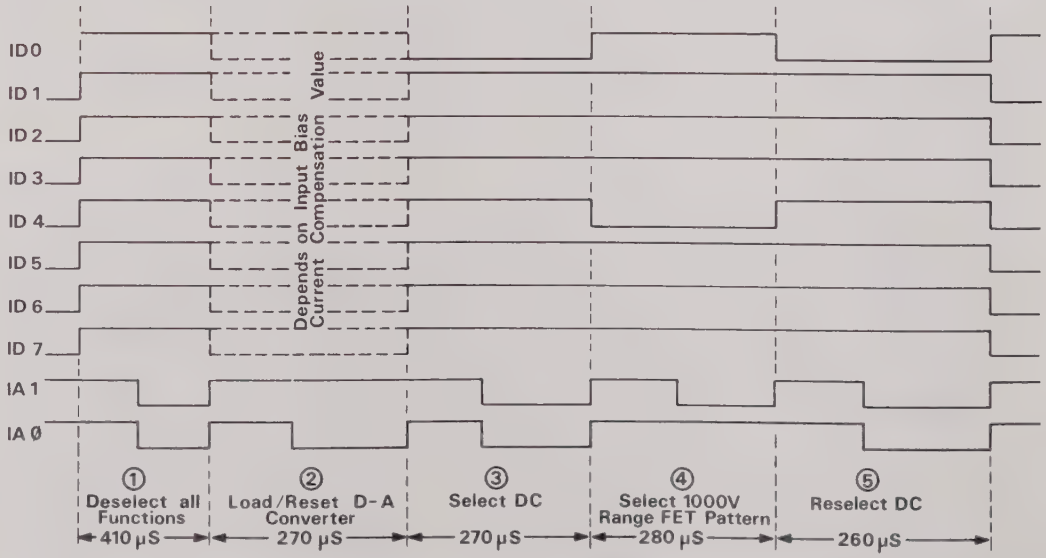


FIG. 3.4 ANALOG INTERFACE DATA LINE TIMING DIAGRAM (POWER-UP)

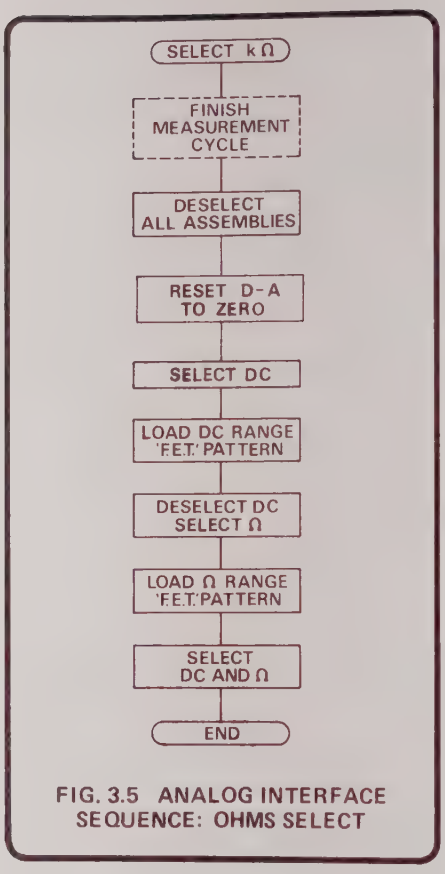


FIG. 3.5 ANALOG INTERFACE SEQUENCE: OHMS SELECT

3.2.1.4 Test

When TEST is selected, a logic '0' is placed on ID7 at stages (iii), (v) and (vii) in Fig. 3.6, i.e. each time a function measurement circuit is selected. Appendix I lists the 'F.E.T.' patterns of each assembly for each test measurement cycle.

3.2.2 DC Isolator Section

3.2.2.1 Preamplifier Scaling (430421 sheet 1)

Figure 3.8 shows the essential features of the isolator scaling circuit. For the purpose of explanation the same symbols are used, regardless of whether the switching is accomplished electronically (F.E.T.) or by means of relay contacts. In Fig. 3.8 all switches are shown in the 1V RANGE position.

The various switching combinations for the different ranges are as follows:—

Range	Gain	Q6	Q7	Q8	Q9	Q10	RL1
100mV	x31.6	ON	OFF	ON	OFF	OFF	ON
1V	x3.16	OFF	OFF	ON	OFF	ON	ON
10V	÷3.16	OFF	ON	OFF	ON	OFF	ON
100V	÷31.6	OFF	OFF	ON	OFF	ON	OFF
1000V	÷316	OFF	ON	OFF	ON	OFF	OFF
$\overline{DC}$		OFF	OFF	OFF	ON	OFF	OFF

The configuration of the circuit for each range is shown in Fig. 3.9.

Reference should be made to circuit diagram number 430421, sheet 1, for the complete circuit. Sheet 2 gives tables of the coding on the input control lines (from the Analog Interface).

When the 100V or 1kV range is selected, a ÷100, 10MΩ input attenuator (R143, R156, R149, R148) is incorporated into the circuit. This is a matched set of resistors for low temperature coefficient. The selection of a lower range energizes relay RL1 (via Q33), causing resistor chain R119-R122 to be in series with the Hi input. Should an overload signal then be applied, the resistor chain limits the current and the power dissipation is such that 1000V can be applied continuously.

The amplifier end of the resistors is clamped by zener diodes D22, D23 and Q18, Q19 to low, thus the amplifier input can never exceed approximately ± 24 volts.

The output from the DC Isolator, test point (TP13) is approximately 3.16 volts ($\approx\sqrt{10}$) for a full range (100,000) input by the following methods (See Fig. 3.9):—

100mV Range — Q6 and Q8 are turned on; all other F.E.T.'s are turned off and RL1 energised. Thus the output of the amplifier is connected to its inverting input via R108, R109, R110, R111 and Q6, an attenuator chain of ÷31.6, giving the amplifier an overall gain of X 31.6 Q8 connects the preamplifier directly to the output.

1V Range — Q10 and Q8 are turned on, all other F.E.T.'s are turned off and RL1 energised. The output of the amplifier is connected to its inverting input via R108, R109, R110, R111 and Q10, an attenuator chain of ÷3.16, giving the amplifier an overall gain of X 3.16. Q8 connects the preamplifier directly to the output.

10 V Range — Q9 and Q7 are turned on; all other F.E.T.'s are turned off and RL1 energised. Q9 causes the amplifier output to be directly connected to its inverting input, giving a gain of unity. The output of the amplifier is attenuated by 3.16 (R114, R115) before being passed to the output via Q7 instead of Q8.

100V and 1000V Ranges — These two ranges select the 1V and 10V ranges respectively but a ÷100 attenuator (R149, R156, R143, R148) is inserted between Hi and the preamplifier input when RL1 is de-energised.

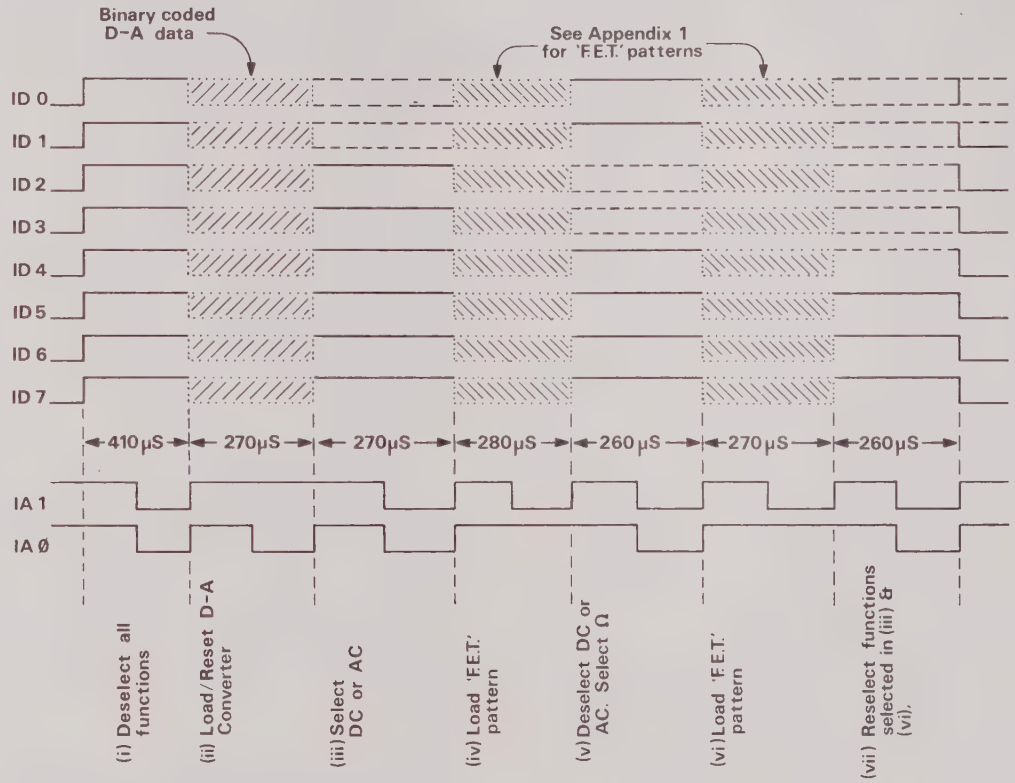


FIG. 3.6 GENERAL FORM OF ANALOG INTERFACE UPDATE TIMING DIAGRAM

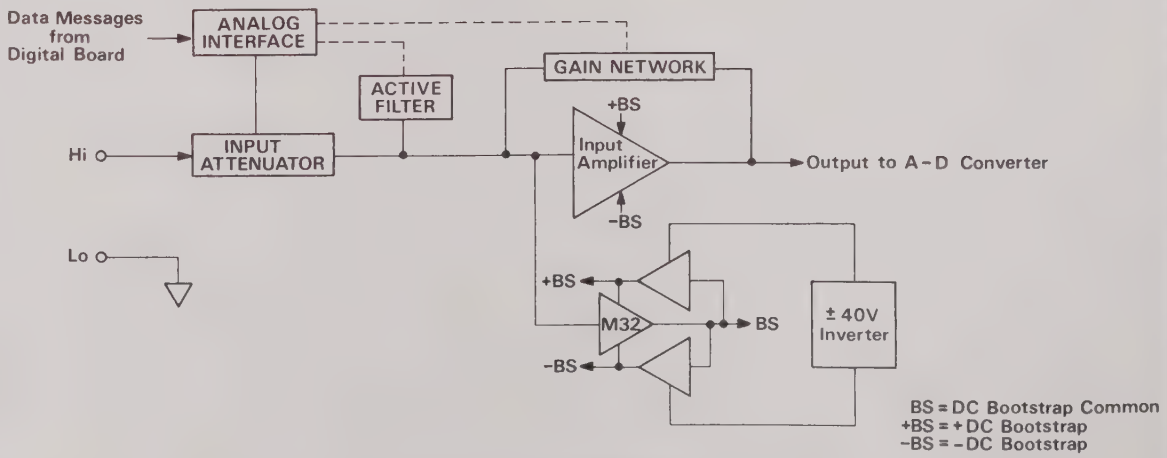


FIG. 3.7 SIMPLIFIED DIAGRAM OF DC ISOLATOR

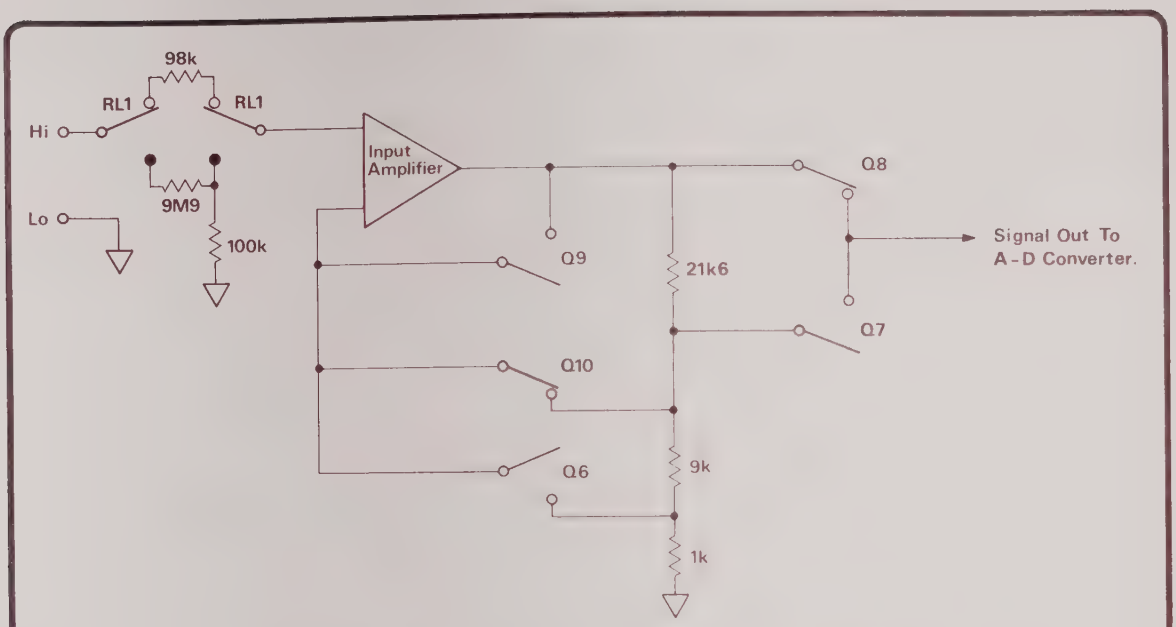


FIG. 3.8 SIMPLIFIED DIAGRAM OF ISOLATOR SWITCHING

3.2.2.2 Preamplifier (430421 sheet 1)

The preamplifier is designed to present an input impedance of greater than 10,000MΩ for signals up to ±20 volts. It is also bootstrapped (tracking of both ground lines and supply voltages with input signal) being essential for correct operation of input bias compensation, temperature compensation and common mode rejection.

Q12 is a well matched monolithic NPN transistor pair exhibiting minimal voltage drift and low noise characteristics, the output being buffered by M31. The input bias current is compensated as described in 3.2.2.5.

3.2.2.3 D.C. Bootstrap (430421 sheet 2)

Bootstrapped supplies are generated which track the input signal directly (BS), track the input signal with a positive offset of +12V(+BS) and track the input signal with a negative offset of −12(−BS).

M32 is the high impedance buffer which tracks the inverting input of the preamplifier. The offset of M32 is adjusted so that its input is within 100μV of the input of the preamplifier. M32 thus functions as the low impedance rail (BS) following the input signal.

Selection of DC(M20-3) enables the capacitive inverter driven from M33 to provide an unregulated +42V(TL4) and −42V(TL5) supply from the ±15V supply.

The positive bootstrap supply (+BS) is generated as a current source comprising Q26 and the shunt regulator, Q27, referenced to D50. When the output voltage of the regulator is approximately 1.2 volts above D50 cathode, Q27 conducts current into R175. Since the current in R175 is controlled to be constant by Q30, referenced to D50, the current flowing through R174 is reduced. Hence the supply current, "mirrored" in R173, is reduced and the output voltage controlled.

The negative bootstrap supply (−BS) is generated in a similar manner. Thus bootstrapped supplies of approximately ±12 volts are produced, tracking the input signal exactly.

3.2.2.4 Filtering (430421 sheet 1)

Selection of filter causes an active filter to be switched in by relay, R12, (via Q32). The filter gives an attenuation of −34 dB at 50Hz. The essential components of the filter are shown in Fig. 3.10.

3.2.2.5 Input Bias Current Compensation (430421 sheets 1 and 5)

To avoid taking current for the input bias of Q12 through the input attenuator and therefore from the source being measured, network R152, R153, R159 and R128 provides this current from the internal bootstrap supplies. R159 is adjusted to reduce the current in R144 to less than 10pA.

Since the gain of Q12 varies with temperature, without any further form of compensation, the bias current of Q12 will change and pass current through R144. To avoid this and maintain the input bias current of Q12 constant with temperature, the emitter current is made to vary with temperature using network R123, R126 and R135 in conjunction with the base-emitter temperature sensitivity of Q12, see Fig. 3.11.

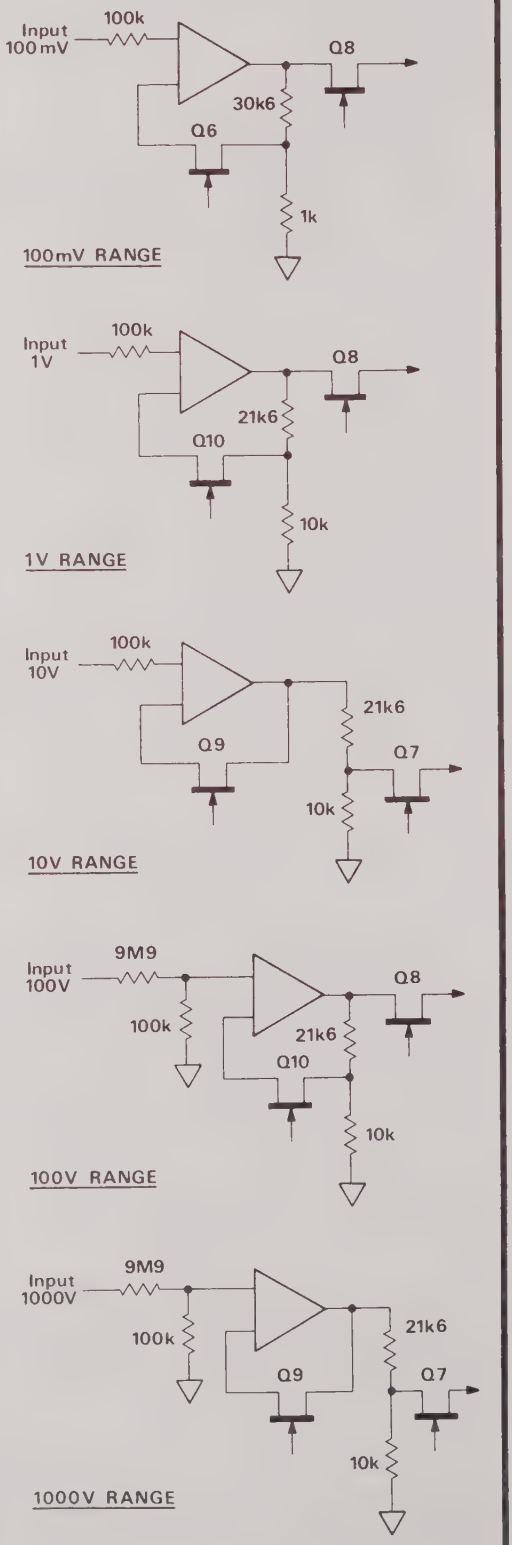


FIG. 3.9 PREAMPLIFIER GAIN CIRCUITS

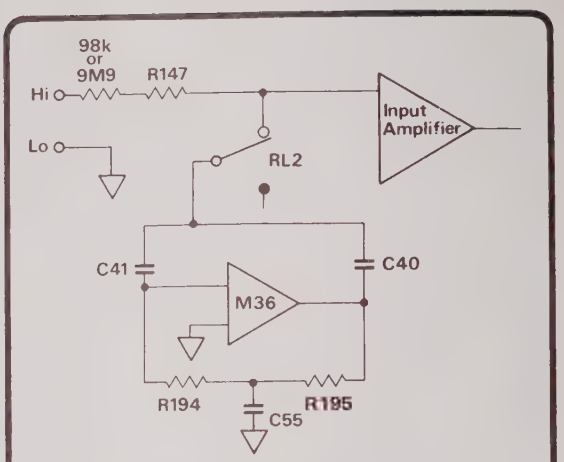


FIG. 3.10 SIMPLIFIED DC ISOLATOR FILTERING CIRCUIT

3.2.2.6 Test (430421 sheets 1 and 5)

During the self-test routine, (actuated from the front panel or remotely programmed) the DC isolator is checked for correct operation. The circuitry is placed into the 0.1V range, as described in 3.2.1.3, except that relay RL1 is not energized, (i.e. the ÷ 100 attenuator is across the input amplifier). Filter is selected and F.E.T. Q5 'closed' via M20-5 causing a small signal to be injected into the feedback path of the input amplifier. Thus a signal of −3.125 volts is output from the DC Isolator (TP13). This signal is then measured and compared with a stored value. If the measured signal is within ±6% of the stored value, the test continues with a 1V range check and a 10V range check.

Range	Output signal from DC Isolator (TP13)
0.1V	− 3.125 volts
1V	− 0.2193 volts
10V	− 0.06932 volts

DC Isolator Output Test Voltages

3.2.3 Analog to Digital Conversion (Analog Section) (430421 sheets 3 and 4)

3.2.3.1 General Principles

Section 1 and Fig. 1.2 of the User's Handbook gives a very basic description of the principles of the integration involved. The technique used in the Autocal Voltmeter is a quadruple slope, the two extra slopes being towards the end of the signal and reference integration periods respectively.

Fig. 3.11 is a simplified diagram showing the essentials of the analog section of the A - D conversion and should be used with timing diagram Fig. 3.12 for full appreciation of the circuit operation.

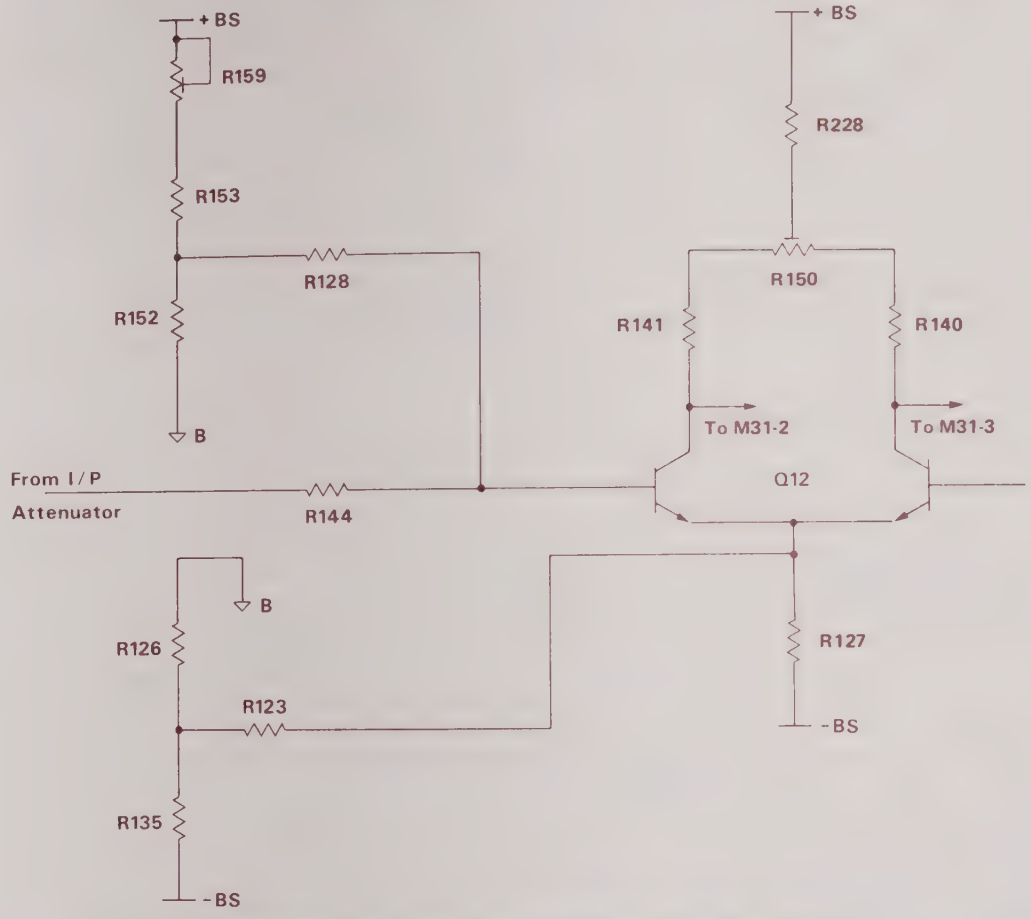


Fig. 3.11 PREAMPLIFIER INPUT BIAS CURRENT COMPENSATION

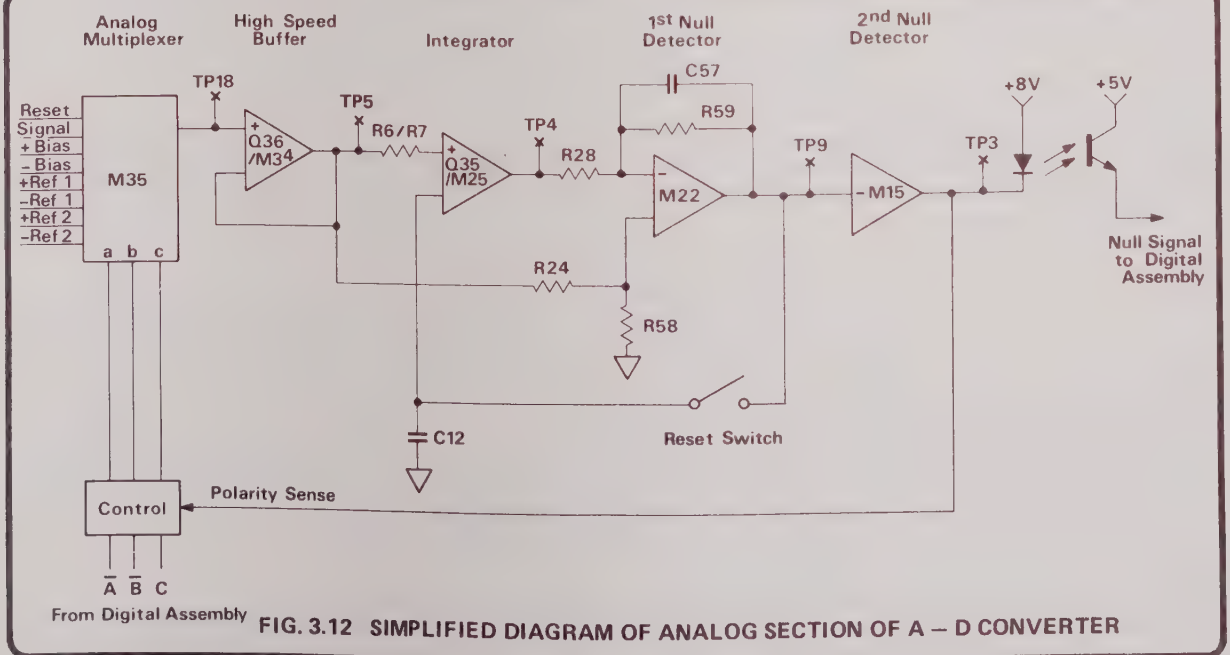


FIG. 3.12 SIMPLIFIED DIAGRAM OF ANALOG SECTION OF A – D CONVERTER

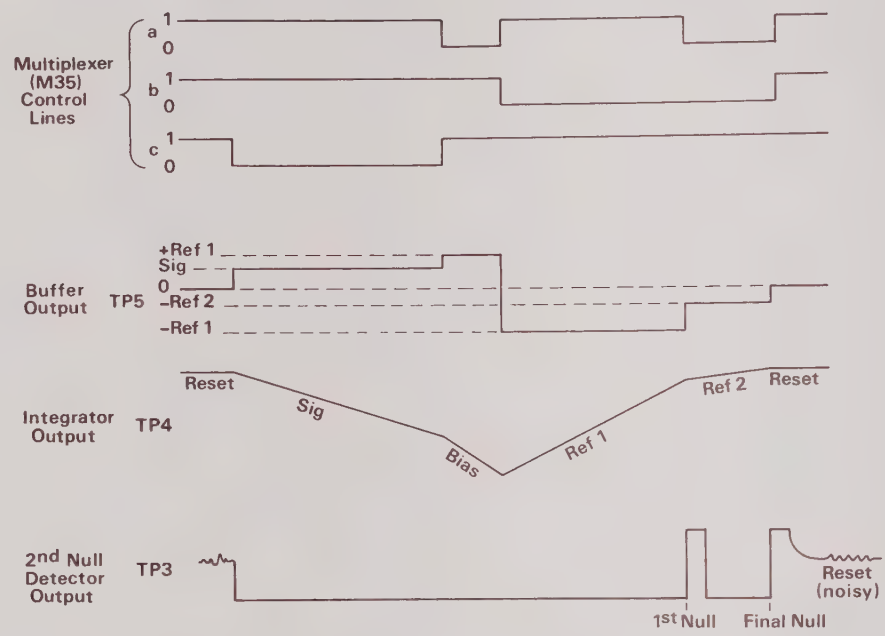


FIG. 3.13 TIMING DIAGRAM FOR ANALOG SECTION OF A – D CONVERTER (Positive Signal)

Timing is not to scale, Bias & Ref. 2 periods being very short compared with Sig & Ref.1

3.2.3.2 A - D Input Control

The analog signal from the DC Isolator is applied to the analog multiplexer (M35) and fed to the input of the buffer (Q36/M34). This in turn feeds the signal to the integrator comprising of Q35, M25 and C9.

Control of the multiplexer is derived from the Digital assembly via opto-isolators M4, M5 and M6. These signals control the sequence of events, allowing first the signal, then a bias voltage of the same polarity as the signal, followed by opposite polarity reference and reference ÷16 signals to the buffer and integrator. The multiplexer is then placed in a reset condition ready for the next measurement cycle. Fig. 3.14 gives the multiplexer control line sequence for both positive and negative signals.

STATE	a	b	c	STATE	a	b	c
RESET	1	1	1	RESET	1	1	1
SIG	1	1	0	SIG	1	1	0
+ BIAS	0	1	1	–BIAS	0	1	0
–REF 1	1	0	1	+REF 1	1	0	0
–REF 2	0	0	1	+REF 2	0	0	0
RESET	1	1	1	RESET	1	1	1
	Positive signal				Negative signal		

Logic levels : (0 ≡ –8V, 1 ≡ +8V)

Fig 3.14 MULTIPLEXER CONTROL LINE SIGNALS

3.2.3.3 Reference Voltages and Control Logic Power Supply

REF 1 : The two halves of M39 in conjunction with zener diodes D60 and D59 form the positive and negative reference voltages respectively, D65 and D64 being 'start-up' diodes (see Fig. 3.15). The outputs of M39 (+11 and –11 volts) supply the defined current for the reference zeners via R212 and R38 respectively. R19 and R18 are selected by Datron so that each zener has very low voltage temperature coefficient.

The resistor chains R41-R43 and R88-R90 are binary weighted values allowing the set up of the exact nominal REF 1 voltages, of ±6.42V, by cutting the appropriate links.

REF 2 : The second reference is 1/16th of REF 1. The positive and negative REF 1 voltages are divided by R71, R68 and R214, R70 respectively.

The power supplies for the logic circuits M35, M29, M27, M28 and opto-isolators M1, M4, M5 and M6 are also derived from M39 via zener diodes D61 and D62, giving supply voltages of ±8 volts.

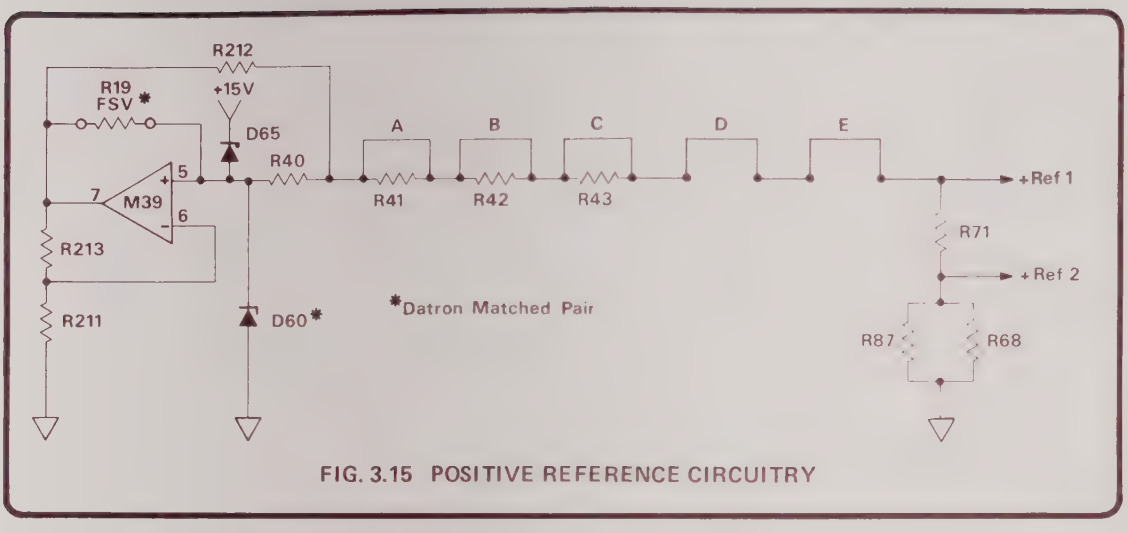


FIG. 3.15 POSITIVE REFERENCE CIRCUITRY

3.2.3.4 High Speed Buffer

C22 slows the switching edges from the multiplexer M35 so that the buffer cannot slew-limit and thus lose the charge. The signals are fed to Q36, M34 which comprise a high speed buffer with high common mode rejection ratio (See Fig. 3.16). The common mode rejection is dependent on the power supplies of Q36 (from R66 and R11-R15) being bootstrapped to the output of the buffer, via D2 and D4. Thus the difference between input signal and power supply around the input stage is maintained constant whatever the input signal.

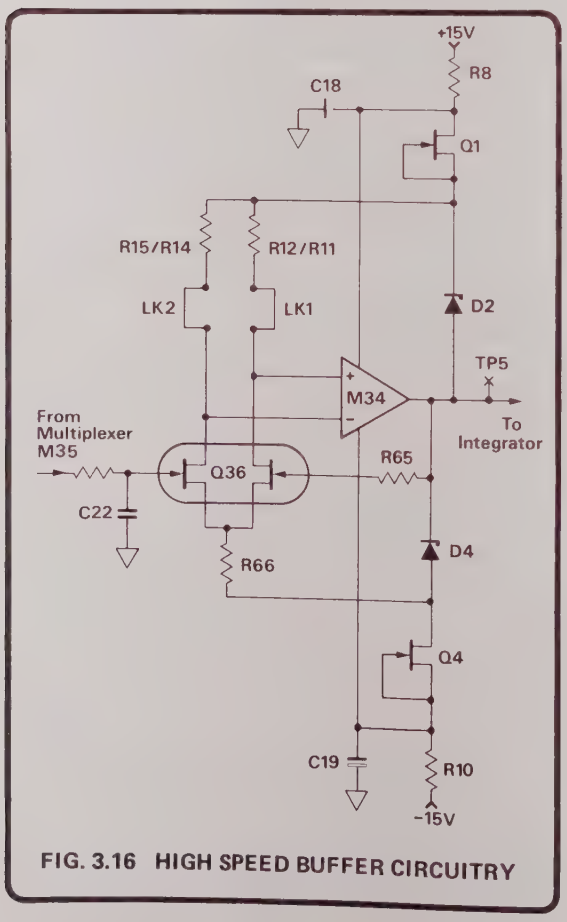


FIG. 3.16 HIGH SPEED BUFFER CIRCUITRY

3.2.3.5 Integrator

The Integrator basically comprises an amplifier made up from Q35 and M25 with a charge storing capacitor C9 (See Fig. 3.17). The low gate leakage F.E.T. pair, Q35, boosts the gain of the integrator such that it is great enough to guarantee no non-linearity errors due to finite gain.

R4, C10 driven by an attenuated and inverted version of the integrator-output waveform, via R26 and R5, form a circuit to compensate for the small amount of dielectric absorption present in C9.

C11, R23 and R27 provide similar compensation but in this case the time constant is such that it effects the linearity, with R23 set to correct linearity at 1/10th of full range.

3.2.3.6 1st Null Detector

The 1st null detector comprises a low noise amplifier, M22, an inverting configuration, where the dc gain is controlled by the ratio of R59 to R28 for small inputs. For larger inputs from the integrator the clamp diodes, D1 and D3, prevent the amplifier from saturating.

During REF 1 the non-inverting input is offset by approximately 10mV to determine the point at which REF 2 is applied (after counting is synchronised). In REF 2 the offset reduces by a factor of 16 giving the null reference point.

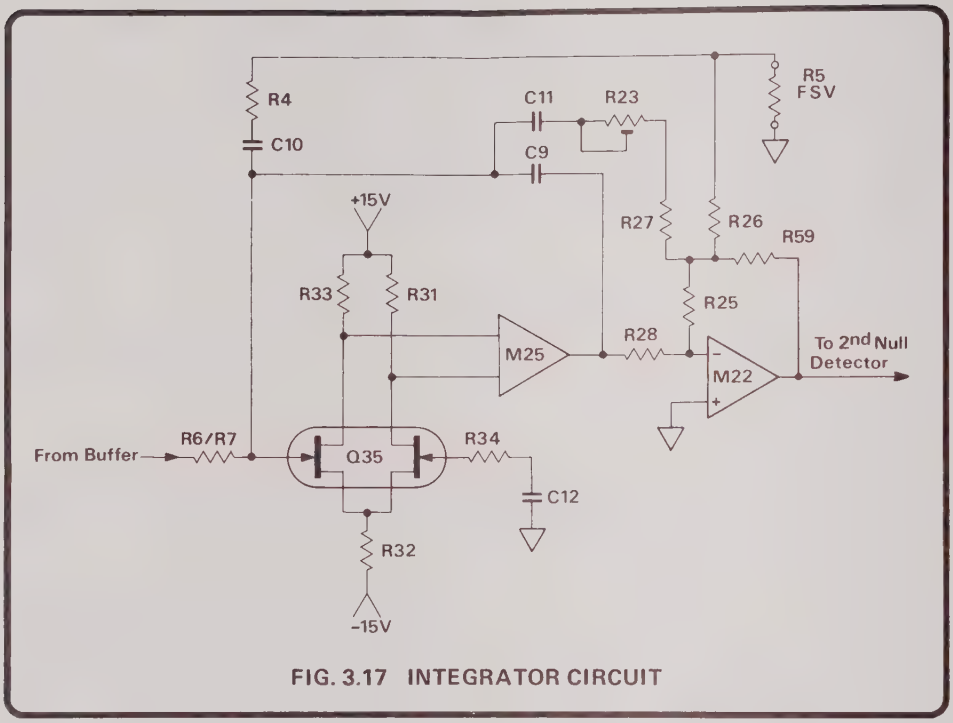


FIG. 3.17 INTEGRATOR CIRCUIT

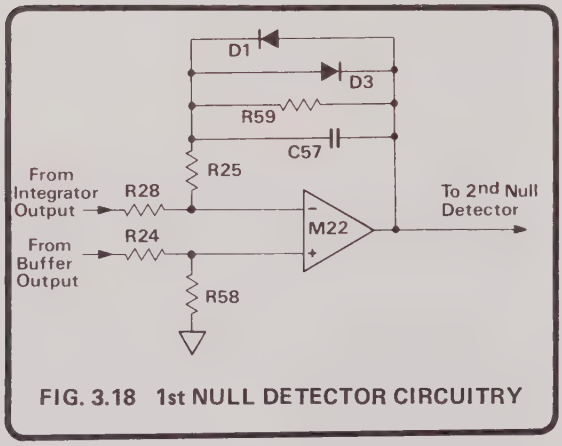


FIG. 3.18 1st NULL DETECTOR CIRCUITRY

3.2.3.7 2nd Null Detector

The signal from the 1st null detector is applied to M15 which boosts the voltage gain. The output provides a logic drive signal via opto-isolator M1, signalling the digital circuitry whenever a null condition changes, Fig. 3.19.

When 'Zero' is selected or the instrument is in the 'Cal' mode, an averaging process is performed over a series of 16 readings to provide greater resolution. (See Fig.3.20). This is achieved by sequentially introducing a small offset into the second null detector from the digital to analog converter, M28, which is clocked by M6 and enabled by the level shifted $\overline{AVE}$ signal.

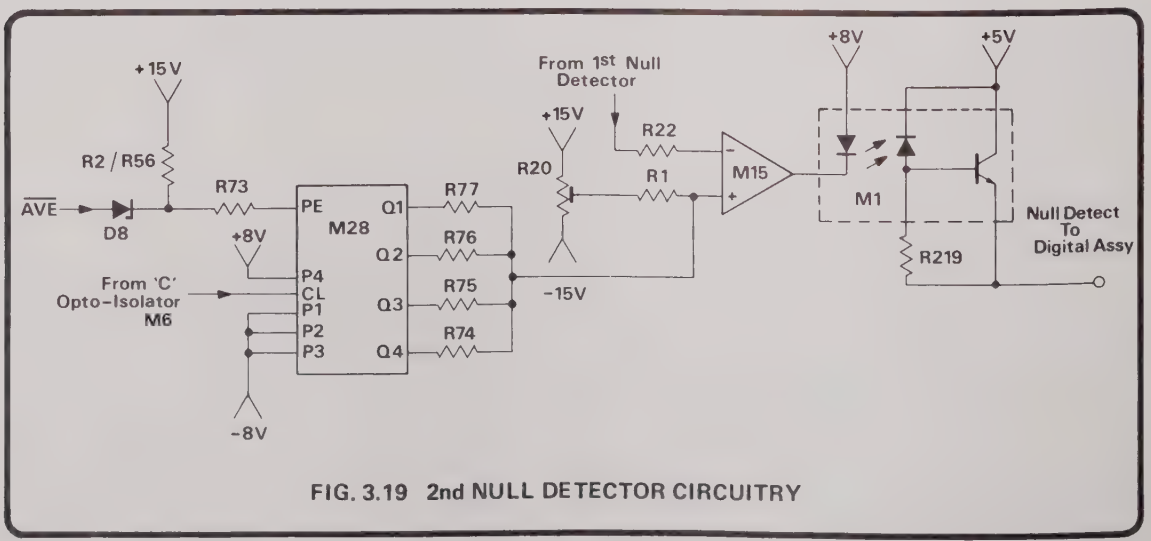


FIG. 3.19 2nd NULL DETECTOR CIRCUITRY

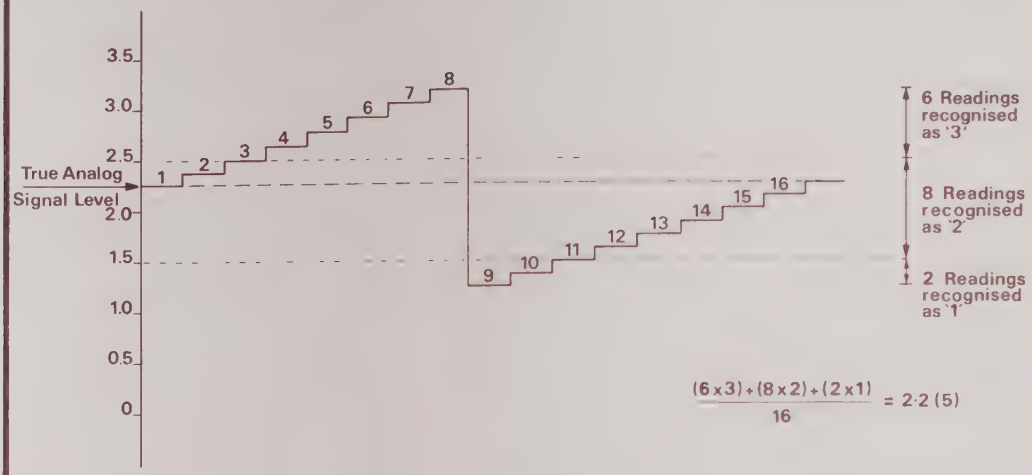


FIG. 3.20 DIAGRAM OF AVERAGING PROCESS

3.2.3.8 Reset Period

At the end of a measurement cycle or when 'Reset' is selected on the front panel, the circuitry is placed into a reset condition. The control lines of the multiplexer M35 allows the 0 volts reference input, at pin 4, to be connected to its output. (See Fig. 3.21). At the same time the reset line (M27-3) is taken high, turning on M26. This reset signal, applied to pins 5 and 12 of M26, allows the output of the 1st null detector to be fed back via R60 to a sample and hold capacitor C12 on the integrator.

Thus, with the input to the A - D converter at zero volts, the charge stored on C12 is the sum of all the offsets from the multiplexer, buffer, integrator and 1st null detector, allowing the 1st null detector to indicate the true zero crossing (null) point.

The reset signal applied to M26 pins 6 and 13 merely allows a lower impedance path between the buffer and the integrator to speed up the settling time as C9 is discharged to zero.

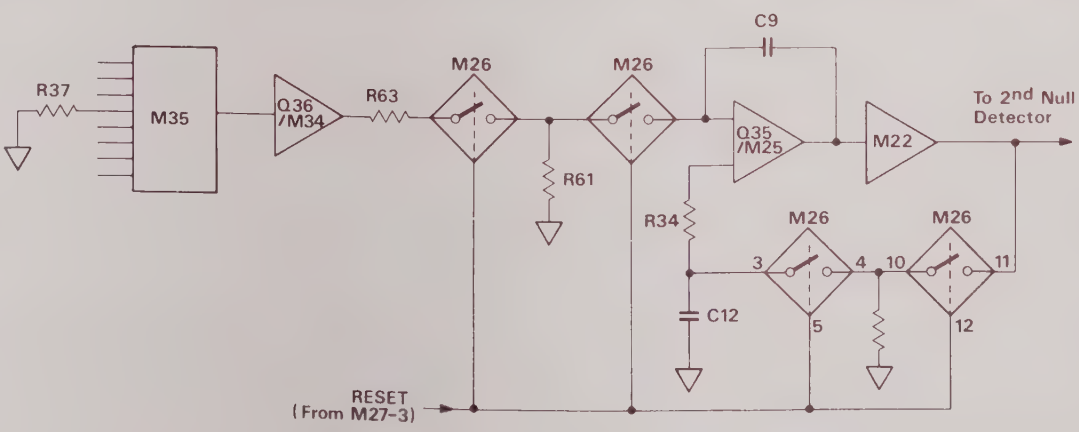


FIG. 3.21 SIMPLIFIED DIAGRAM OF A – D DURING RESET PERIOD

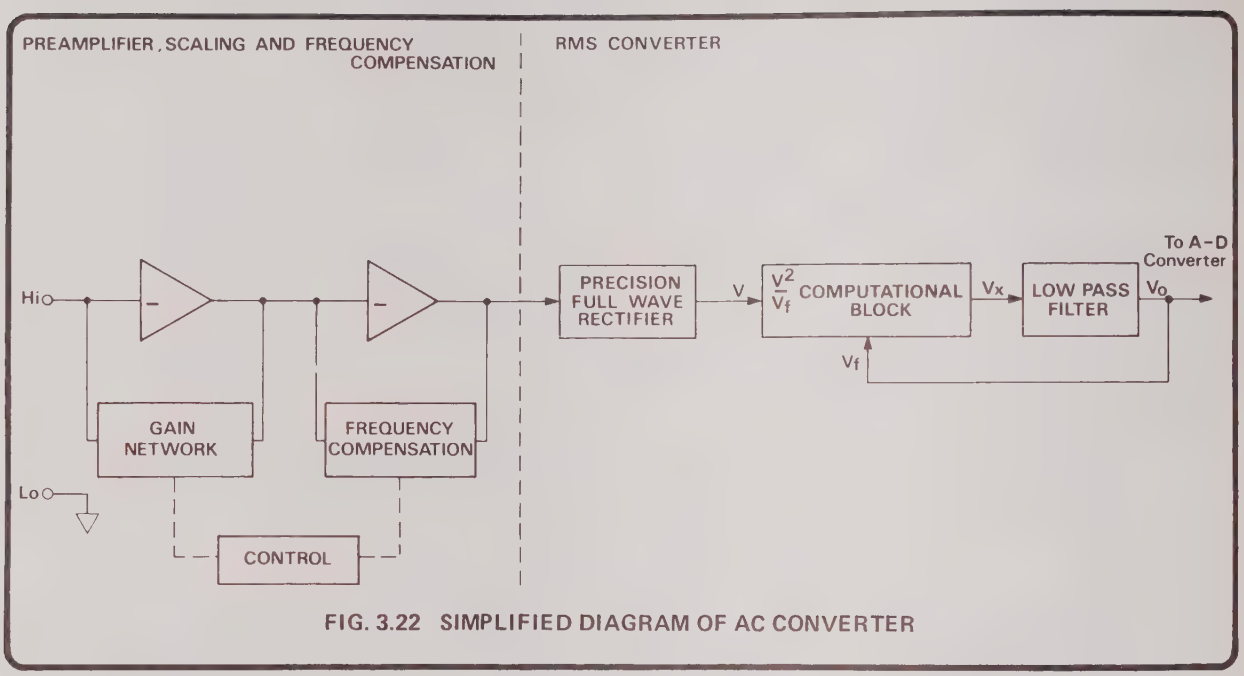


FIG. 3.22 SIMPLIFIED DIAGRAM OF AC CONVERTER

3.3 AC ASSEMBLY (Circuit Drawing No. 430425)

3.3.1 General Principles

The preamplifier buffers and ranges the signal in order to present 0.9 volts full range to the RMS converter section.

Once converted to an equivalent DC signal, it is applied to the analog to digital converter on the main analog assembly.

The conversion technique is electronic true RMS sensing as shown in the simplified block diagram Fig. 3.22. The Datron RMS module can be best considered as a functional block consisting of circuitry which accepts two inputs, V and V_f, computes V^2/V_f and has an output of V_x which is then filtered so that all the AC components are removed. The output of the block is fed back to V_f, thus closing the loop around the whole circuitry.

Mathematically: $\overline{V_x} = V_o$

but $V_x = V^2/V_f$

$\overline{V^2}/V_f = V_o$, but $V_o = V_f$

$\overline{V^2} = V_o^2$

i.e. $V_o = \sqrt{\overline{V^2}}$

3.3.2 Preamplifier and Scaling (430425 sheet 1)

Relay RL2 is energised on selection of AC, directly connecting the Hi terminal to the input of the AC assembly. If DC and AC are selected together, the AC assembly becomes DC coupled by energising RL3, causing C57, the AC coupling capacitor, to be by-passed.

The signal is then fed to the switched gain inverting preamplifier whose full range output is 0.9 volts r.m.s. A simplified diagram of this arrangement is shown in Fig. 3.23. The frequency response is held flat, to within ±1%, by controlling the gain defining component time constants, to a similar order of accuracy. Residual errors are removed by the frequency compensation stage. (See section 3.3.4).

The preamplifier has a stable DC path provided by a dual transistor pair Q33 and a fast AC path by dual F.E.T.'s Q32 and Q34. Further gain is provided by the following long-tail pair cascade of Q20, Q21, Q22 and Q23, which is loaded by a current mirror, Q24. Q15 and Q16 with bias components Q17 and Q18 form a conventional class AB output stage. R121 compensates for the bias current of Q33, whileR112 trims the offset voltage to zero.

The unity gain frequency compensation amplifier consists of M11. The bootstrap circuit of Q19 presents the varicap diode, D11, with a high impedance, thus ensuring that the varicap is not shunted to ground.

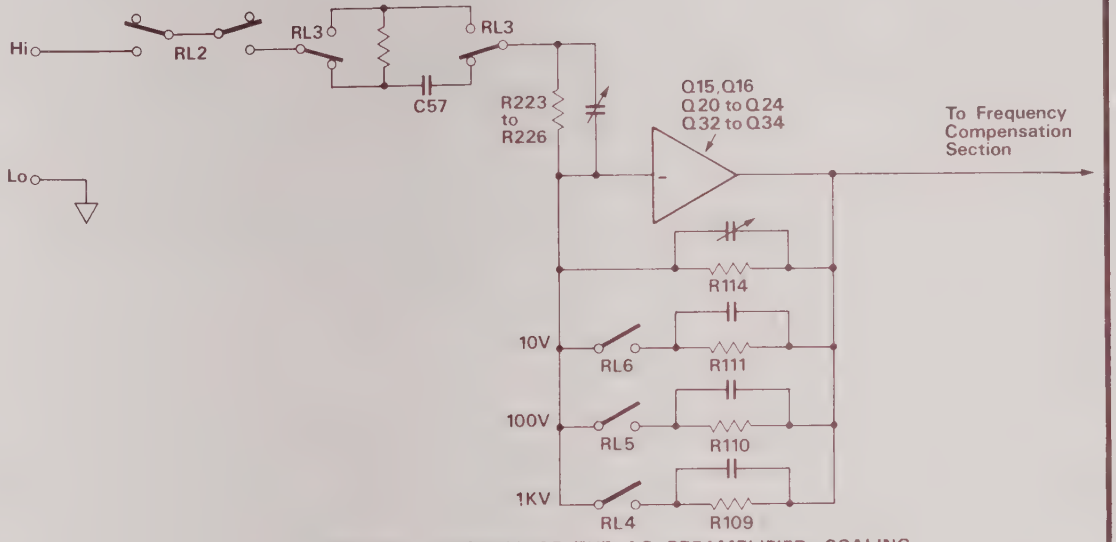


Fig. 3.23 SIMPLIFIED DIAGRAM OF THE AC PREAMPLIFIER SCALING

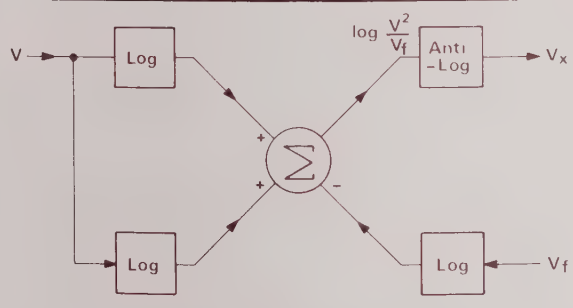


FIG. 3.25 BLOCK DIAGRAM OF RMS CONVERSION TECHNIQUE

3.3.3 RMS Converter (430425 sheet 2)

The RMS converter takes the scaled AC signal from the preamplifier and converts it to an equivalent DC signal suitable for Analog-to-Digital conversion. The conversion technique is electronic true RMS sensing as shown in the simplified block diagram Fig. 3.25.

M8 and M9 form a summing type, full wave rectifier. The output of M8, a precision half-wave rectifier inverter, is summed with the non-inverted signal with a weighting of 2 : 1 at the input of M9. This forces a full-wave rectified current to flow in RMS module M6. Potentiometer R50 balances the rectifier to provide the same output for non-inverted or inverted asymmetric waveforms.

The output current from the RMS module passes into filter-buffer M1 and is converted to a nominal 5 volt for a full range signal. Q1 and Q2 switch in additional capacitors when FILTER is selected, to operate down to 45Hz. M2 is a voltage to current converter providing a feedback current to the RMS module proportional to the output voltage. R90 is the zero adjustment for the half wave rectifier M8 and R35 is the high crest factor gain adjustment. R75 is adjusted for optimum linearity.

The output of M1 (TP2) is fed to a resistor chain R1 - R7, to provide an output of 3.14 volts by the selection of resistors R2 - R5. Q3 is turned on when AC is selected and switches the output of the AC converter into the Analog-to-Digital Converter (Drawing No. 430425 sheets 3 and 4).

3.3.4 High Frequency Compensation

During the calibration cycle, the microprocessor notes and stores the high frequency (HF) error of each range. When AC volts is selected the compensation information for a particular range is recalled by the microprocessor, transferred across the isolation barrier and latched on to M13, M14 (Drawing No. 430425 sheet 5), see Fig. 3.26. The output from the latches is applied to a digital-to-analog converter via connector J1 pin 11 and applied to varicap D11. The varicap is thus adjusted to give the amplifier chain a flat frequency response.

The calibration is carried out at one H.F. frequency but since it flattens the AC amplifier response, the correction is valid for all specified frequencies. It should be noted that the calibration routine is iterative since the varicap is non-linear.

3.3.6 Test

During the self-test routine (actuated from the front panel or remotely programmed) the AC assembly is checked for correct operation. The circuitry is placed into the 1V range as described in Section 3.2.1.3. Filter is selected and F.E.T. Q31 is 'closed' from M5 - 13 causing a signal of 0.08 volts DC to be injected into the preamplifier. Thus a signal of approximately 0.314 volts is output from the RMS section and applied to the A - D converter situated on the Analog assembly. This signal is then measured and compared to within ±6% of the stored value.

Range	Output from RMS section
1	+0.314 volts

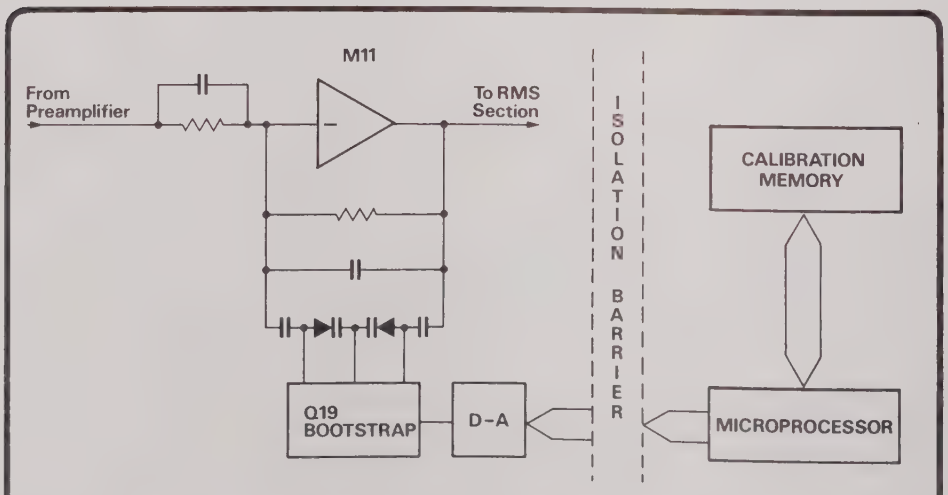


Fig. 3.26 SIMPLIFIED DIAGRAM OF AC HIGH FREQUENCY COMPENSATION

3.4 OHMS ASSEMBLY (Circuit Drawing No. 430426)

The instrument functions by measuring the voltage across an unknown resistance with a known constant current flowing in it. The converter can be split into two parts a low drift voltage follower and a constant current source covering 5 decades from 100nA to 1mA (see Fig. 3.27).

It should be noted that when the Ohms function is selected the DC Isolator Lo is no longer directly connected to the front/rear panel Lo terminal, but goes via RL1 on the Ohms assembly. Lo becomes an active terminal in resistance measurements.

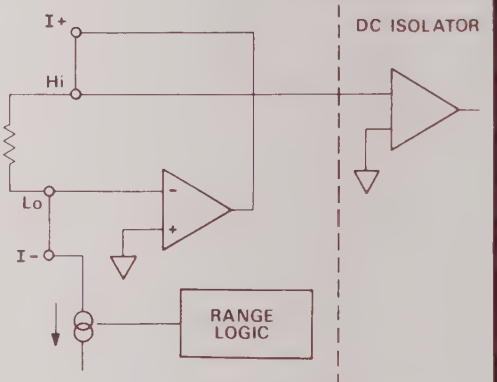


FIG. 3.27 SIMPLIFIED RESISTANCE CONVERTER

3.4.1 Low Drift Voltage Follower

When OHMS is selected, the front panel Lo terminal is connected to the –ve input of amplifier Q10/M3, the +ve input being referred to DC isolator Lo (this remains reference common). Q10/M3 will thus apply a voltage at the I+ terminal via RL1 such that the voltage at front panel Lo is at reference common plus any offset due to Q10/M3. This voltage offset drift is kept small for changes of temperature by compensating the input bias current of Q10 with the current in R67, which changes with temperature due to the voltage drift at Q10 emitters. Q10 input bias current is initially nulled by R26.

Thus if we consider 2-wire measurement, I+ is linked to Hi, I– is linked to Lo and the unknown resistance linked between Hi and Lo, with a constant current flowing from I+/Hi, through the unknown resistance (R_X) to Lo/I–. The Lo terminal is maintained at 0V. Therefore the Hi terminal (DC Isolator Input) is at $I_{constant} \times R_X$ volts above Lo. As long as the error is small referred to reference 0, the DVM will read the correct resistance.

Input protection is provided as follows:–

Voltage/Current applied to input terminals:

I+	R9, D10
I–	R2, D2, R23
Lo	R12, R13, Q8, Q9

Open circuit voltage limit protection:

I+	D10
I–	D2

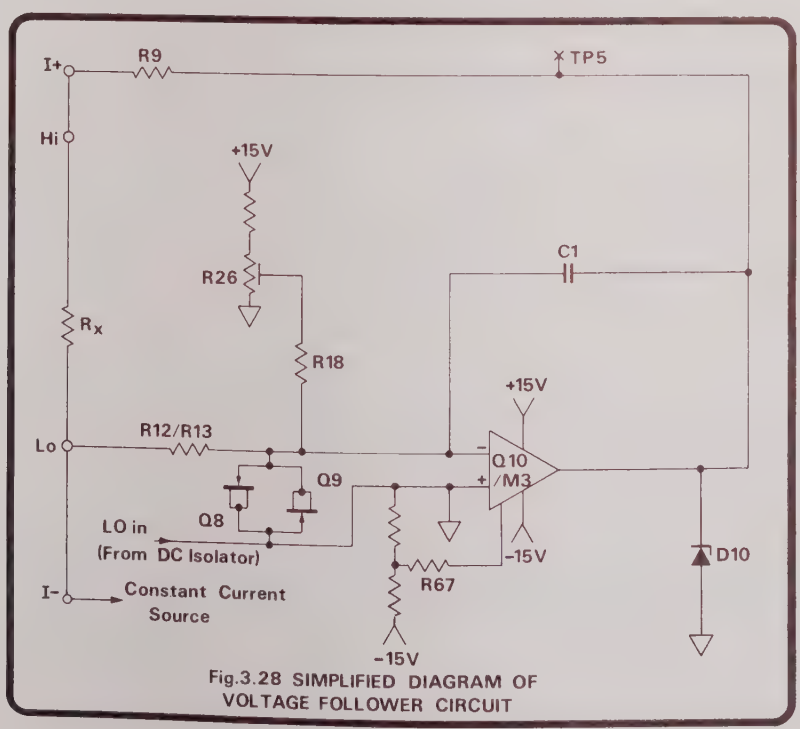


Fig.3.28 SIMPLIFIED DIAGRAM OF VOLTAGE FOLLOWER CIRCUIT

3.4.2 Constant Current Source

Six decades of ohms ranges are provided by 5 ranges of current and 2 ranges of DC Isolator voltage gain (100mV range for 100Ω, 1V range otherwise). See Fig. 3.29.

Range	Current	F.E.T.'s/Switches turned on	
		Current Selector	Leakage path
100Ω	1mA	M1(A)	
1kΩ	1mA	M1(A)	
10kΩ	100μA	M1(B)	
100kΩ	10μA	M2(A)	M2(B)
1MΩ	1μA	M1(D)	M2(B), M2(C)
10MΩ	100nA	M1(C)	M2(B), M2(C)

FIG. 3.29 OHMS CURRENT RANGE SWITCHING

When kΩ's is selected, Q17 (430426 sheet 2) is turned on enabling astable M6 to produce a 200Hz signal to switch M5. Thus when gates B and C of M5 are open, C9 is charged up from the negative reference (originating from the analog section of the A - D converter). These gates then close and A and B open, sharing the charge with C8, the voltage across C8 equals the reference voltage (sheet 1). The voltage developed across C8 causes M4 to sink current through resistor chain R24, R25, R29, until the voltage developed across the chain balances that across C8. Thus the current required for a particular range is selected by the value of the resistor chain switched by M1 and M2. Simplified diagram Fig. 3.30 shows the resistor chain and switching for each range. On the high resistance ranges leakage paths are provided by M2(B) and M2(C).

To produce good common mode rejection, the negative supply of M4 is bootstrapped. The filtered bootstrap supply (–ΩBS) powers the astable (M6) and bilateral switch.

The use of ohms guard permits in-circuit measurement of resistors, provided shunt paths are greater than 500Ω and a suitable tapping point is available. Consider Fig. 3.31. Guard is reference 0, Lo is actively maintained within microvolts of reference 0 (as previously explained). Thus there is no voltage across Rz and consequently no current in Rz. Voltage follower Q10/M3 will simply pass more current into Ry from the I+ terminal until the selected current for the particular range flows through Rx.

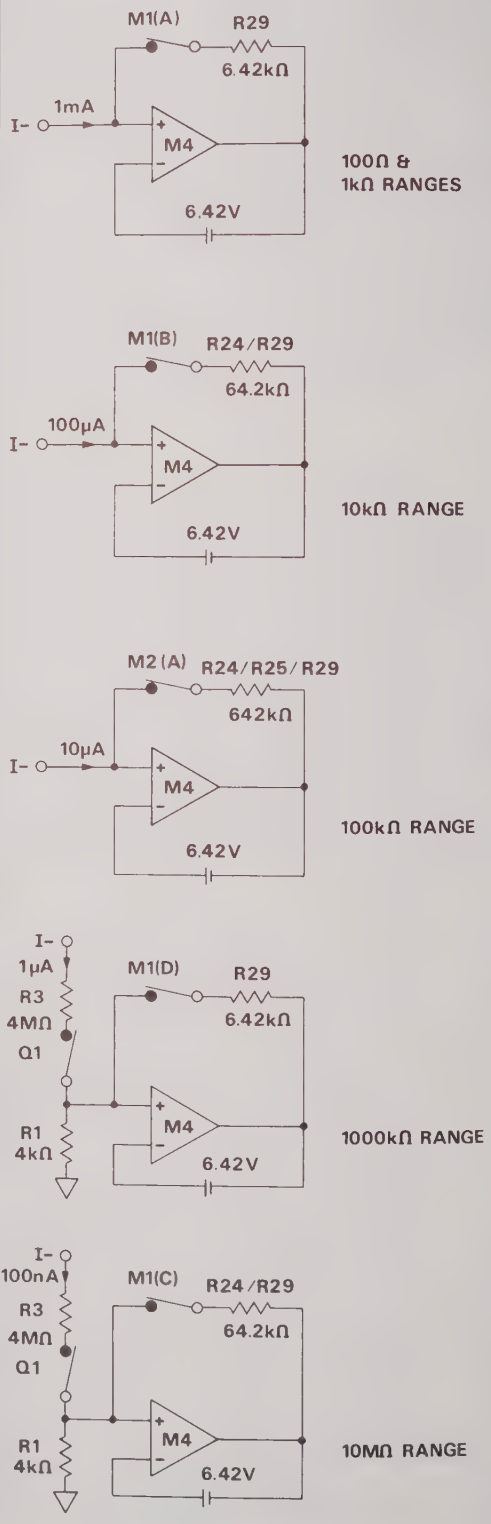


FIG. 3.30 SIMPLIFIED Ω CURRENT SWITCHING

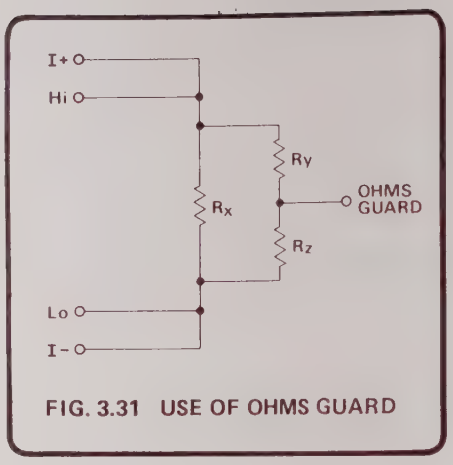


FIG. 3.31 USE OF OHMS GUARD

3.4.3 Test

During the self-test routine (actuated from the front panel or remotely programmed), the Ohms Converter is checked for correct operation. The circuitry is placed into the 10kΩ range as described in Section 3.2.1.3. Filter is selected and F.E.T. Q5 'closed' from M9-1 causing R8 (9.76kΩ) to be placed between I+ and I−. Thus with I+ and Hi, I− and Lo connected (2-wire if front panel input selected), the DC Isolator (which is also in the TEST mode) measures the voltage developed across the resistor (approx 1 volt). The resulting voltage output from the DC Isolator is applied to the A-D converter, measured and compared to the stored value. If the measured signal is within ± 6% of the stored value, the test is complete.

3.6 REAR INPUT (Circuit Drawing No. 430423).

3.6.1 General

The Rear Input assembly contains the switching circuitry to enable one of two analog signal sources to be connected to the measurement circuits of the DVM.

3.6.2 Front Panel/Rear Panel Input

When Front Input is selected, either remotely or on the front panel, this causes the base of Q1 to be connected to 0 volts, turning on the transistor. Thus relays RL1 and RL2 are energised, causing the front signal input terminals to be connected to the measurement circuits. Should Rear Input be selected relays RL1 and RL2 are de-energised, connecting the rear input to the measurement circuits.

3.8 DIGITAL ASSEMBLY (Circuit Drawing No. 430422)

The Digital assembly contains the circuitry providing the general management of the instrument and the digital section of the A-D converter. Fig. 3.33 outlines the main portions and signal highways of this board.

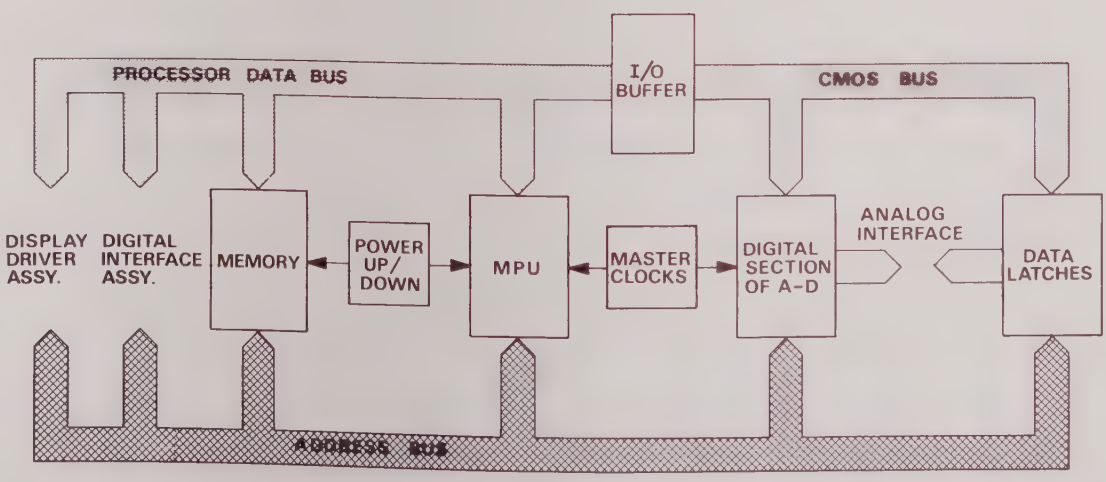


FIG. 3.33 SIMPLIFIED BLOCK DIAGRAM OF DIGITAL ASSEMBLY

3.8.1 Processor and Memory (430422 sheet 1)

A 6800 microprocessor (MPU) together with 8k bytes of memory controls the communication between the front panel, digital interface, display drivers, Digital and analog assemblies. The memory can be split into five main areas:—

(1) Program Memory - needed to operate the whole instrument system.

(2) Constant Data Memory - e.g. Self Test limits, Error read-out specifications and other fixed factors.

(3) Non-volatile Calibration Memory - used to store all the calibration errors used for each reading and determined during the 'Auto-cal' cycle.

(4) Operating Memory - used for scratch pad operations and storing.

(5) Volatile Display Memory - volatile data such as Max-Min stores, Limit stores and computation stores.

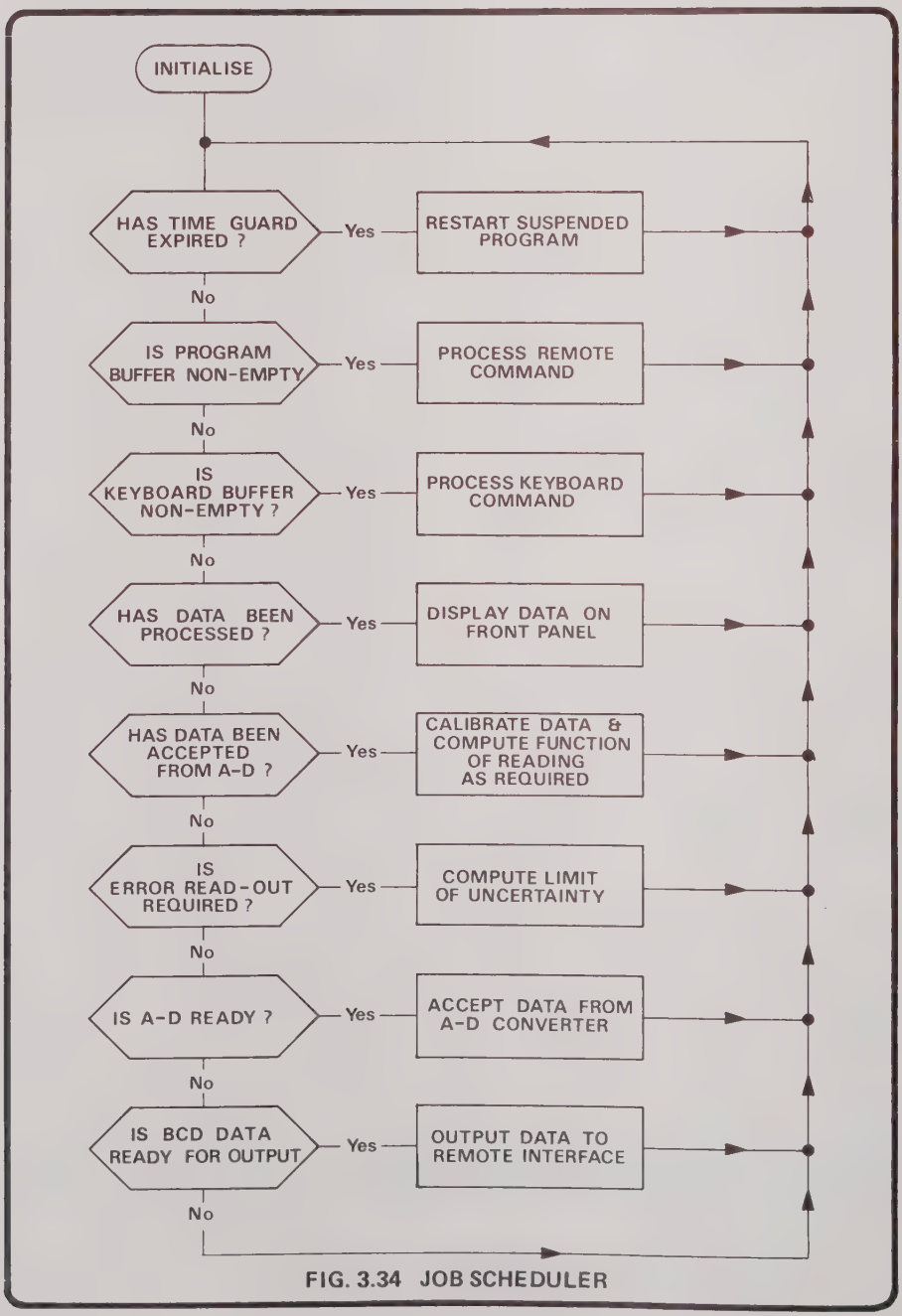
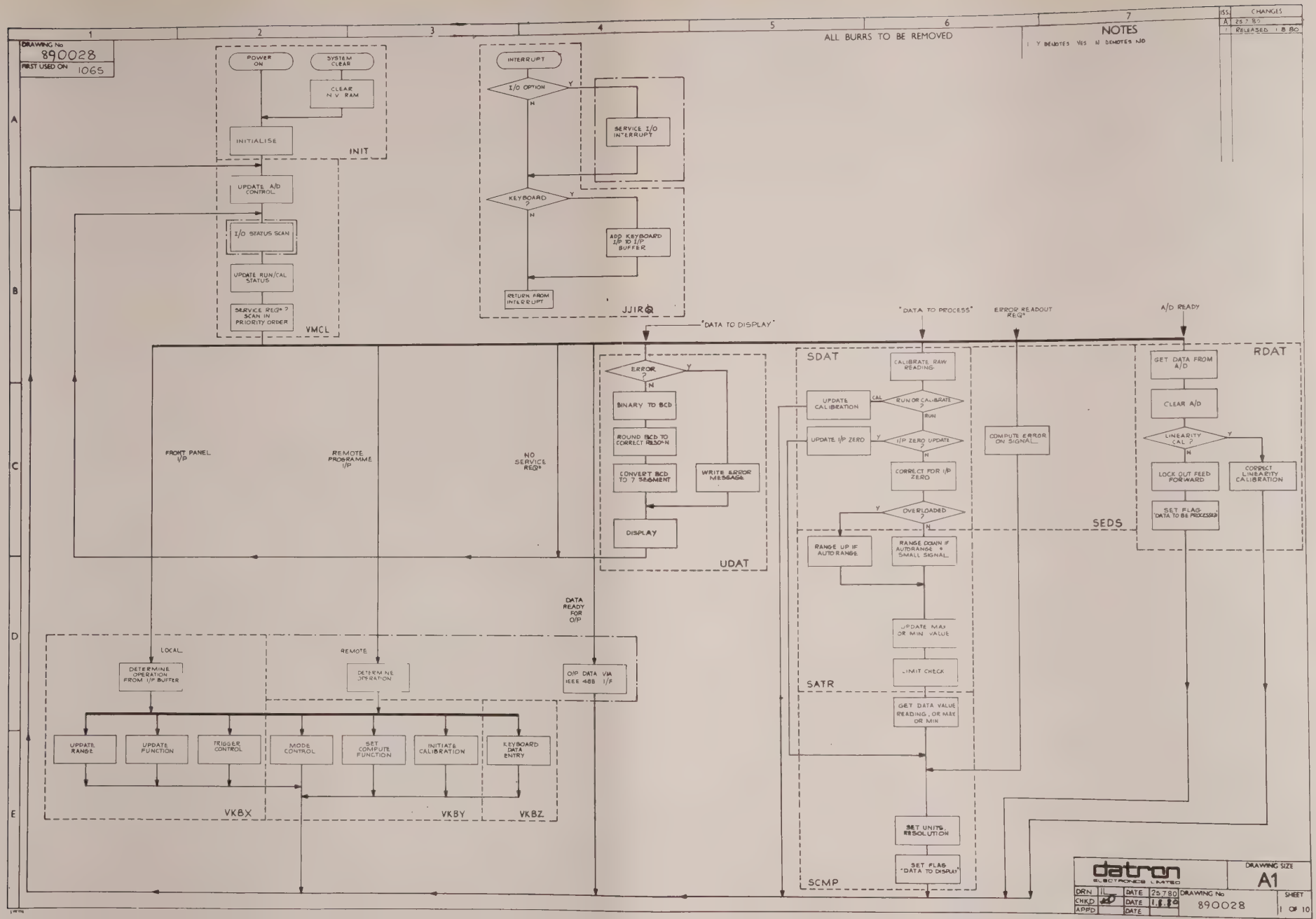


FIG. 3.34 JOB SCHEDULER


DRAWING No 890028
FIRST USED ON 1065
ALL BURRS TO BE REMOVED
NOTES
1 Y DENOTES YES N DENOTES NO
ISS CHANGES
A 25 7 80
1 RELEASED 1 8 80
POWER ON
SYSTEM CLEAR
CLEAR N.V. RAM
INITIALISE
INIT
UPDATE A/D CONTROL
I/O STATUS SCAN
UPDATE RUN/CAL STATUS
SERVICE REQ* ? SCAN IN PRIORITY ORDER
VMCL
INTERRUPT
I/O OPTION ?
Y
N
SERVICE I/O INTERRUPT
KEYBOARD ?
ADD KEYBOARD I/P TO I/P BUFFER
RETURN FROM INTERRUPT
JJIR
"DATA TO DISPLAY"
"DATA TO PROCESS"
ERROR READOUT REQ*
A/D READY
ERROR ?
BINARY TO BCD
ROUND BCD TO CORRECT RESOLN
CONVERT BCD TO 7 SEGMENT
WRITE ERROR MESSAGE
DISPLAY
UDAT
SDAT
CALIBRATE RAW READING
UPDATE CALIBRATION
CAL
RUN OR CALIBRATE ?
RUN
UPDATE I/P ZERO
I/P ZERO UPDATE ?
CORRECT FOR I/P ZERO
OVERLOADED ?
COMPUTE ERROR ON SIGNAL
RANGE UP IF AUTORANGE
RANGE DOWN IF AUTORANGE & SMALL SIGNAL
UPDATE MAX OR MIN VALUE
LIMIT CHECK
SATR
GET DATA VALUE READING, OR MAX OR MIN
SET UNITS RESOLUTION
SET FLAG "DATA TO DISPLAY"
SCMP
SEDS
RDAT
GET DATA FROM A/D
CLEAR A/D
LINEARITY CAL ?
LOCK OUT FEED FORWARD
CORRECT LINEARITY CALIBRATION
SET FLAG "DATA TO BE PROCESSED"
FRONT PANEL I/P
REMOTE PROGRAMME I/P
NO SERVICE REQ*
DATA READY FOR O/P
LOCAL
REMOTE
DETERMINE OPERATION FROM I/P BUFFER
DETERMINE OPERATION
O/P DATA VIA IEEE 488 I/F
UPDATE RANGE
UPDATE FUNCTION
TRIGGER CONTROL
MODE CONTROL
SET COMPUTE FUNCTION
INITIATE CALIBRATION
KEYBOARD DATA ENTRY
VKBX
VKBY
VKBZ
datron ELECTRONICS LIMITED
DRAWING SIZE A1
DRN IL DATE 25.7.80
CHKD DATE 1.8.80
APPD DATE
DRAWING No 890028
SHEET 1 OF 10

3.8.1.1 Software Overview

The system uses the technique of a looping prioritised job scheduler (see Fig. 3.34). Each job driven from the scheduler is controlled by a flag in the system workspace which is set when the job is required to be run and cleared when completed. Priority of activation is ensured by making each job exit on completion, to the top of the scheduler.

Program Modules: The program memory is split into a series of functional modules, each module corresponding fairly closely to a major functional area and hence to one of the jobs activated by the job scheduler, the larger jobs being sub-divided, see Drawing No. 890028.

Data Flow: Two streams of data are handled by the system. The first is the measurement data on which calibration and computation operations are carried out. The second, asynchronous with the first, consists of commands derived from the front panel or IEEE 488 I/F and controls the measurement circuits and the computation programs. Operations on the measurement stream basically consist of acquiring the raw data from the A-D converter, calibrating this data and carrying out any other computations, and converting and formatting the data for output. Note that a job consuming data is given higher priority than the one producing data for it, allowing a producer to place data into an empty buffer. The consumer is activated by a flag, set by the producer to indicate data ready in the buffer.

Processing Control: Control of the instrument by the processor, initiated from the front panel or digital interface, is arranged by using a 'pipeline control' of the major system state and a 'first in/first out' buffer between the interrupt level routine receiving the control command and the main program implementing it. The major system state consists of the range, function, resolution, filter, ratio, autorange, etc., flags and the computation mode (reading, A-B, ÷C, etc.). The pipeline comprises three levels. The top, level 1, reflects the state being programmed, the second, level 2, the state of the measurement circuits and the third, level 3, the measurement being processed. When a command is input, level 1 is updated (e.g. a new range is selected) and as soon as the measuring circuits are not converting an input signal, the state in level 1 is moved to level 2 causing the measurement circuits to update to the new state. When an A-D conversion is complete, data is read from the A-D and the state transferred from level 2 to 3, providing information for the processing routines. Additionally, at this time, the level 1 to level 2 transfer is repeated and the measurement circuits again updated to allow for commands received while the conversion is in progress.

A second control mechanism used is to input all the commands via a 'first in/first out' buffer between the interrupt level routine receiving the command and the main program implementing it. Thus the processor under remote control is able to 'simultaneously' set up the requirements for the next reading, convert the current reading and process the last one.

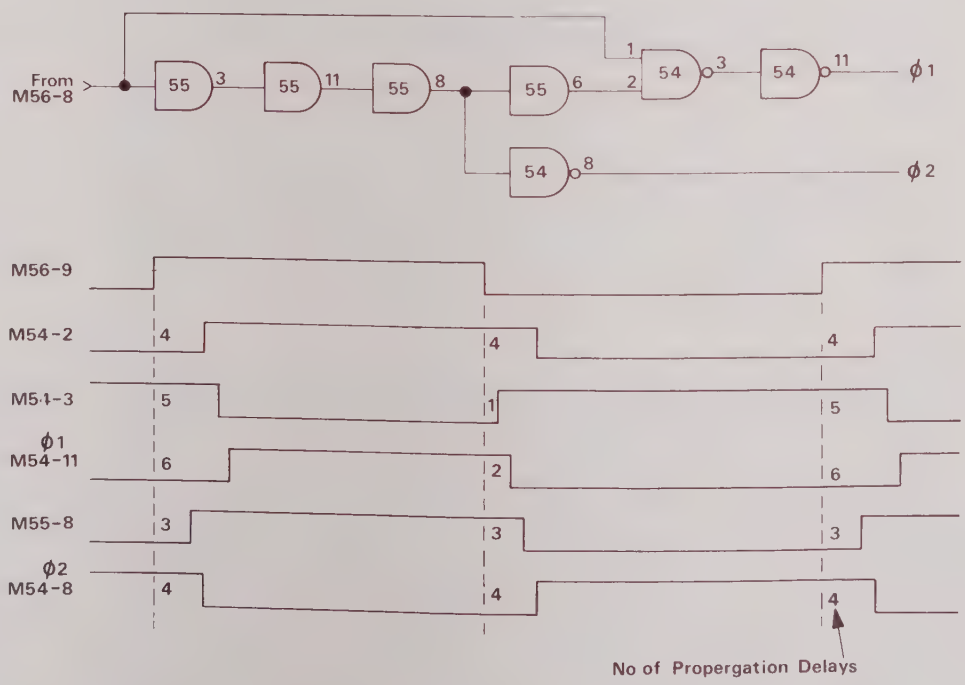


FIG. 3.35 TWO-PHASE CLOCK GENERATION

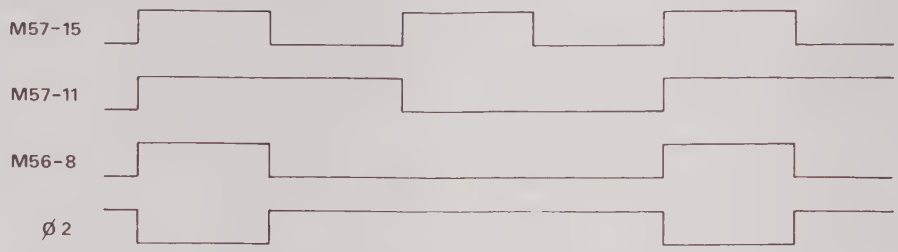


FIG. 3.36 TIMING DIAGRAM OF STRETCHED TWO-PHASE CLOCK

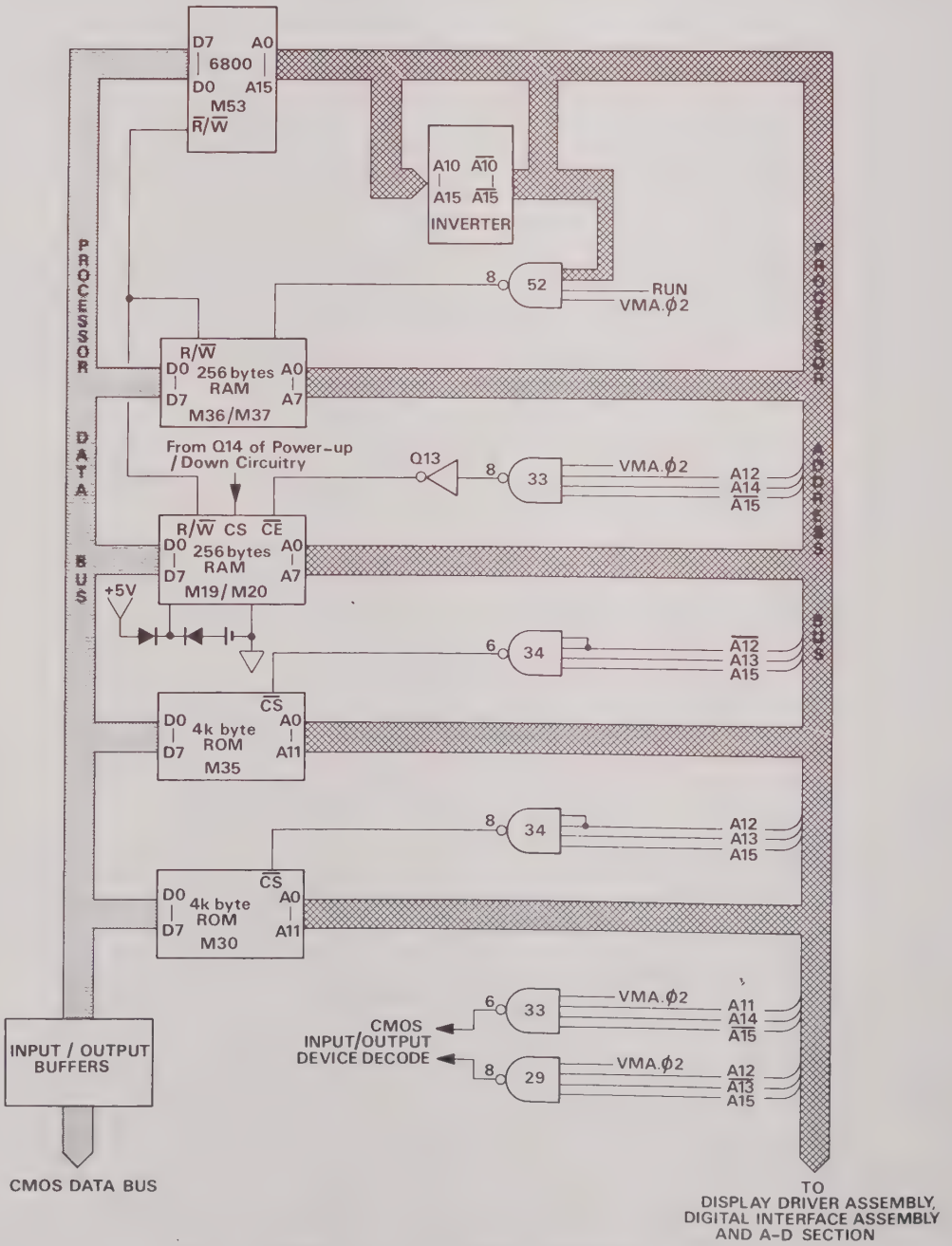


FIG. 3.37 SIMPLIFIED DIAGRAM OF MEMORY CIRCUITS

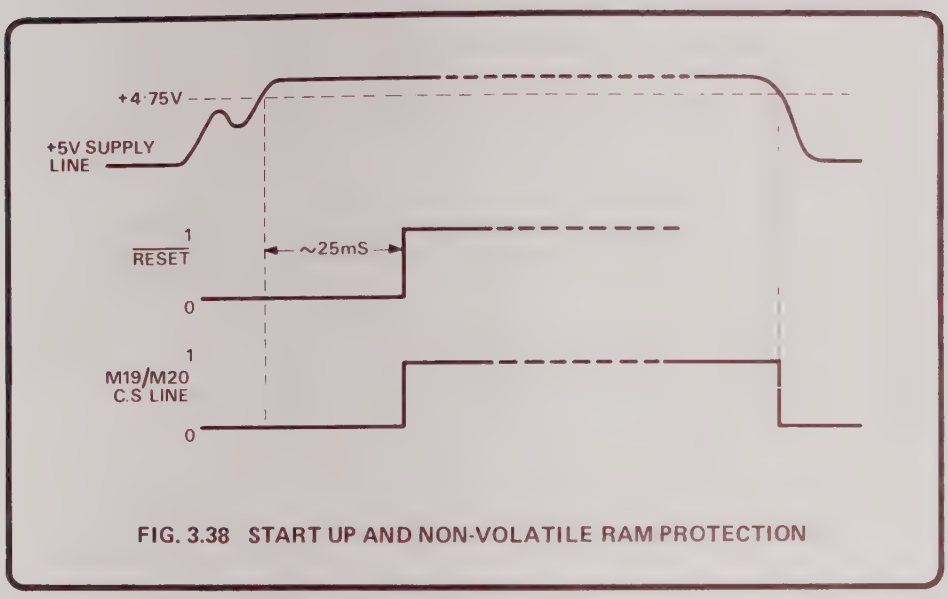


FIG. 3.38 START UP AND NON-VOLATILE RAM PROTECTION

3.8.1.2 The Two-Phase Clock

The 6800 requires a non-overlapping positive two-phase (Ø1, Ø2) clock and is derived from the line locked master clock (sheet 4) producing a 1.6MHz (50Hz supply) or 1.9MHz (60Hz supply) signal. M57 acts as a ÷2 thus antiphase 800kHz square-waves appear on pins 14 and 15. If data is not being transferred to the CMOS Bus, M57-11 is high, thus M56-8 follows M57-15. The non-overlapping of Ø1 and Ø2 is produced by the utilisation of the inherent propagation delay (approx. 10nS) through each gate of M54 and M55. This is best seen by referring to Fig. 3.35 the circuitry around the output stage increasing the voltage levels demanded by the processor (0V and +5V).

During a period when data is being transferred across the CMOS Data Bus, Ø1 and Ø2 are reduced to 400kHz by utilising the other half of M57. The signal CMOS I/O is high thus a 400kHz square-wave is output on M57-11, the waveforms of Ø1 and Ø2 are altered such that one half of the period is stretched, covering 1½ cycles of the normal 800kHz operation. (See Fig. 3.36).

3.8.1.3 RAM/ROM Circuit

The 6800 uses two ROM's which contain the programs necessary to run the instrument. Each ROM is able to store up to 4096, 8 bit 'words' of program information which are grouped in program modules. Both ROM's receive the address information output by the processor on to the Processor Address Bus. The particular ROM to be addressed being selected by decoding three of the address lines and applying the resultant to the 'chip select' line (via M34 pins 6 or 8) (See Fig. 3.37).

The information held in that particular location is sent back to the processor via the Processor Data Bus.

The processor also uses 512 bytes of 8-bit wide RAM made up from four 256 x 4 bit RAM'S. Half of this memory (M19/20) is backed up with a battery to provide the non-volatile calibration and zero store and can only be overwritten when 'CAL' or 'Zero' is selected. The remaining 256 bytes (M36/37) are used as operating memory for scratch pad operations and storing volatile data (e.g. Max, Min). A particular location is set by the 6800 on the Processor Address Bus using A_0 to A_7, the pair of RAM's being selected by decoding some of the other Processor Address lines with VMZ.Ø2. Control of the read/write lines is performed by the MPU, the signal being gated with a 'Master Clock ÷ 2' signal to provide correct timing.

An instrument power up is detected by M60/M62 causing an initialisation $\overline{\text{RESET}}$ signal to be fed to the MPU via Q16. (See Fig. 3.38).

During a power-up or power-down (+5V supply line $<$ +4.75 V) a signal from the supply-level detectors prevents RAMS M19 and M20 from being overwritten by holding the CS (chip select) lines low ($<$0.2 volts) via Q14 for a period of approx. 25mS determined by R55/C32.

3.8.2 CMOS Address Decode and Input/Output Circuits (430422 sheet 2)

Information is transferred to and from CMOS devices via the CMOS Data Bus during periods when the signal CMOS I/O is high (M33-6). This takes place when the Processor Address Bus bits A11, A14 and A15 are high. The transfer of data between the Processor Data Bus and the CMOS Data Bus takes place at 400kHz, the Read/Write lines selecting the direction of information through the tri-state buffers M4, M5 and M6.

In order to uniquely address the various CMOS input/output devices, the address lines must be further decoded. M16 and M32 are dual 2 to 4-line decoders using the states of CMOS I/O and address lines A0, A1, A4, A5 to enable or partially enable the input/output devices, except the output of M16 pins 2 and 15 which are inverted and gated with data line A2 to produce the required decode.

A5	A4	A2	A1	A0	SIGNAL	M32/M16 Pin No.	Operation
0	0	1	X	X	$\overline{XKYBRD}$	M32-7	Keyboard read/write
0	1	X	X	X		(M32-6)	Forces a MPU 'power up' sequence
1	0	1	X	X	$\overline{XADDT}$	M32-5	A-D main counter output enable
1	1	X	X	X		(M32-4)	Analog interface address latch input enable
0	0	X	0	0	$\overline{XKDSP0}$	M16-7	partially enables input to keyboard l.e.d. latches
0	0	X	0	1	$\overline{XKDSP1}$	M16-6	
0	0	X	1	0	$\overline{XKDSP2}$	M16-5	
0	0	X	1	1	$\overline{XKDSP3}$	M16-4	
1	0	X	0	0	$\overline{XADSTA}$	M16-9	A-D, and interupt status output enable
1	0	X	0	1		M16-10	Error switch output enable
1	0	X	1	0	$\overline{XADCTL}$	M16-11	A-D control latches, input enable
1	0	X	1	1	$\overline{XADDLY}$	M16-12	A-D delay counter input enable

FIG. 3.39 CMOS ADDRESS DECODING

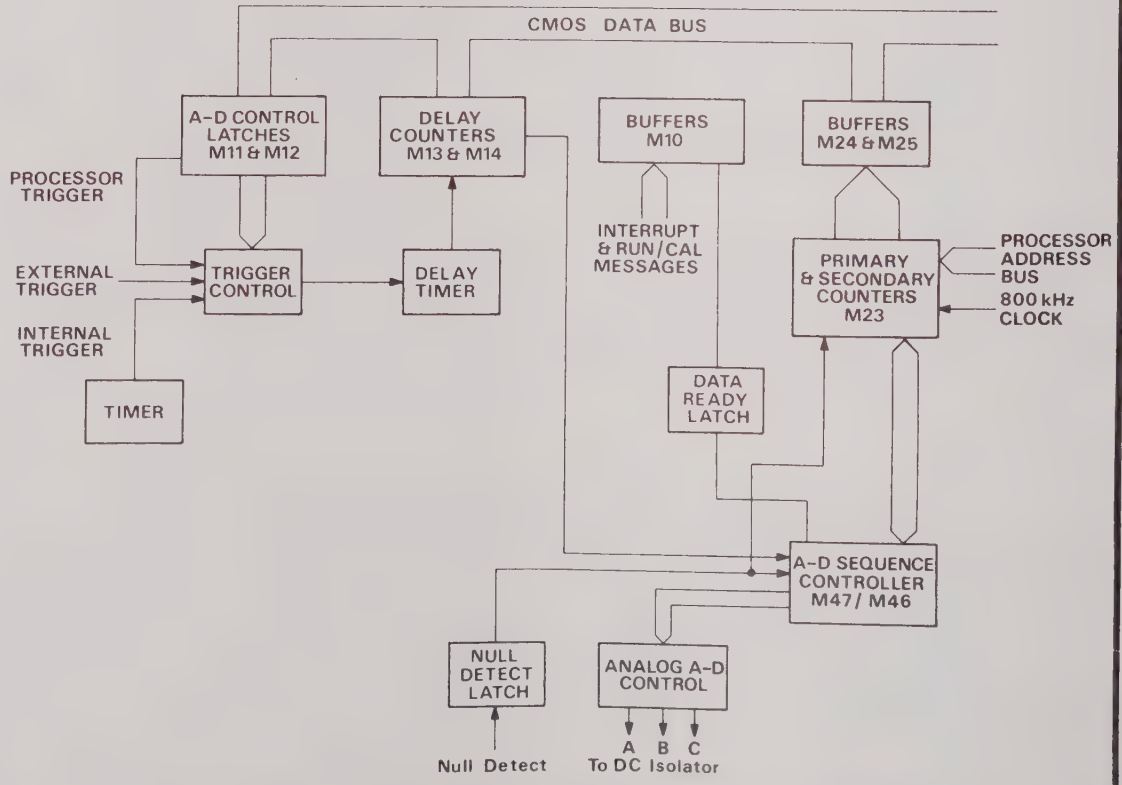


FIG. 3.40 SIMPLIFIED DIAGRAM OF DIGITAL SECTION OF A–D CONVERTER

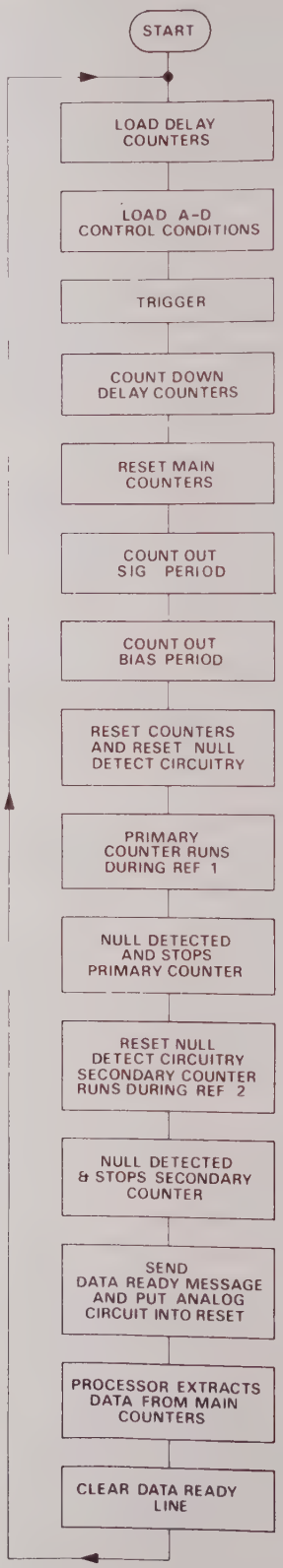

START
LOAD DELAY COUNTERS
LOAD A-D CONTROL CONDITIONS
TRIGGER
COUNT DOWN DELAY COUNTERS
RESET MAIN COUNTERS
COUNT OUT SIG PERIOD
COUNT OUT BIAS PERIOD
RESET COUNTERS AND RESET NULL DETECT CIRCUITRY
PRIMARY COUNTER RUNS DURING REF 1
NULL DETECTED AND STOPS PRIMARY COUNTER
RESET NULL DETECT CIRCUITRY SECONDARY COUNTER RUNS DURING REF 2
NULL DETECTED & STOPS SECONDARY COUNTER
SEND DATA READY MESSAGE AND PUT ANALOG CIRCUIT INTO RESET
PROCESSOR EXTRACTS DATA FROM MAIN COUNTERS
CLEAR DATA READY LINE

FIG. 3.41 FLOWCHART OF A–D DIGITAL SECTION

3.8.3 Analog to Digital Conversion (Digital Section)

3.8.3.1 General Principle

Block diagram Fig. 3.40 outlines the essentials of the digital section and should be used with flowchart Fig. 3.41 in order to follow the operation of this section.

The function of this section of the circuitry is to generate the sequence that when transferred to the analog section, controls the sequence from RESET through the integration cycle and back to RESET. The circuitry controls the length of SIG and BIAS and counts during REF 1 and REF 2, the accumulated count being proportional to the length of the reference periods, which in turn is proportional to the measured input signal. At the end of each reading cycle the count is read by the MPU, processed and displayed.

3.8.3.2 Preset Procedure

As part of the initialisation routine (at switch on), M47 (used as the sequence controller), is reset from M37-11, causing M47-2 to be logic '1'. Thus the control lines $\overline{A}$, $\overline{B}$ and $\overline{C}$ put the analog section of the A-D into RESET (See Fig. 3.42). The Address Bus decoded signal $\overline{XADDLY}$ is taken low, enabling the presetting of the delay counters M13 and M14 from the CMOS Data Bus, the amount of delay being determined by the selected range, function and filter state, see Fig. 3.43. The A-D control latches, M11 and M12 are then enabled by $\overline{XADCTL}$ to (i) reset the command latch M1 (from M11-4), (ii) set the resolution of the main counter (M11-5 and 6), (iii) select trigger gate (M12-3, 4 or 5) and (iv) reset the data ready latch (M12-6).

SIGNAL	$\overline{A}$	$\overline{B}$	$\overline{C}$
RESET	1	1	0
SYNC	1	1	0
SIG	1	1	1
BIAS	0	1	1
WAIT	0	1	1
REF 1	1	0	1
REF 2	0	0	1
END	1	1	1

FIG. 3.42 A-D ANALOG SEQUENCE CONTROL SIGNALS

FUNCTION	1065 COUNT	
	$\overline{\text{FILTER}}$	FILTER
DC Volts	2	101
AC Volts	46	151
DC + AC Volts	46	151
Ohms	2(1)	101(1)

(1) 1MΩ Range $\overline{\text{FILTER}}$: 4, FILTER : 121
10MΩ Range $\overline{\text{FILTER}}$: 31, FILTER : 251

FIG. 3.43 COMMAND DELAYS

3.8.3.3 A-D Measurement Sequence

Trigger. The trigger, required to initiate the measurement sequence, is generated from one of three possible sources:

1. Internally generated 3/second trigger, from timer M61-7.
2. Externally generated trigger, from EXT TRIG on rear panel via M24-13.
3. A MPU derived trigger from M11-3 generated when auto-ranging, pressing MANUAL when HOLD selected, during calibration, an INPUT ZERO sequence or via the digital interface.

The trigger source is selected by the latched data on M12, enabling one of the three gates of M2.

Delay. The trigger pulse clocks the 'command latch' M1 causing the timer, M15, to output clock pulses (200Hz) to the delay counters (M13 and M14) after a delay of approx. 1.5mS set by C5, R8, R9, R11. The delay counters proceed to count down to zero, at which time the delay latch (M26) is clocked. Thus M26-14 becomes a logic '1', enabling the sequencer M47 (an octal counter) to proceed on to the next step via M46-2.

SYNC. The SYNC phase from the sequencer resets the counters of M23 and places the analog section of the A-D into SIG. The pulse is fed back to M47 via M46-3 to step on the sequencer.

SIG. During the time the SIG line is high (M47-3), the primary counter in M23 is enabled and counts out the signal period (2.5mS superfast or 20mS normal mode). At the end of this period, M23-23 goes high and passes via M46-10 enabling the sequencer to step on once again.

BIAS. The BIAS signal (M47-7) is transferred to the analog section of the A-D by changing the state of the $\overline{A}$ line (M38-9 to a logic '0'). BIAS also enables the secondary counter of M23 to count out the BIAS period (20μS). The signal indicating the end of this period is passed via M46-9 causing the sequencer to carry on to the next step. The BIAS signal also resets the 'delay latch' (M26) ready for the next measurement cycle, and the 'null detector' latch (M22A).

WAIT. The WAIT pulse resets the counter of M23 via M39-10, keeps the $\overline{A}$ line to the analog section low, clocks the polarity null detect latch M22(B) causing a logic '1' on pin 1 if the signal applied to the analog section of the A-D converter was positive (logic '0' if negative) and is fed back to enable the sequencer via M46-3.

REF 1. The high to low edge of WAIT causes the $\overline{A}$ to change state and going into REF 1 makes $\overline{B}$ a logic '0'. The analog side is then in the condition to start 'ramping down'. While REF 1 is high the primary counter of M23 is enabled (pin 3) and counts the period of REF 1.

REF 1 is ended when a null detector pulse is detected and latched on to M22. This causes the sequencer to step on once more from M46-3, the low to high edge from pin 4 disabling the primary counter.

REF 2. The REF 2 signal changes the state of the $\overline{A}$ line (causing the analog section to ramp down at a slower rate), reset the 'null detect' latch and enable the secondary counter of M23 (Pin 13) to count the period of REF 2. If the secondary counter overflows the primary counter is incremented from M26-16.

As in REF 1, a null detector pulse causes the counting period to end (M26-13) and increment the sequencer via M46-3 causing the $\overline{A}$ and $\overline{B}$ lines to change state.

END. The low to high edge from M47-10 is fed back to M47, via M48-6 giving a master reset. Thus the sequencer is placed into RESET.

RESET. The sequence pulse from M47-2 clocks the 'data ready' latch M1-3 placing a signal on to the CMOS Data Bus via tri-state buffer M10 indicating to the MPU that a reading is ready to be taken from the main counter M23. Data is extracted from the counters in three bytes (controlled by the A1 and A0 lines of the processor address bus) with the counter output buffers, M24 and M25 being enabled by $\overline{\text{XADDT}}$, a decoded processor address.

The RESET signal is also passed to the analog section of the A-D by changing the state of the C line.

Once the data has been extracted from the main counter the set-up procedure is then repeated to await a further trigger.

3.8.3.4 Master Clock and Line Locking (430422 sheet 4)

To give improved rejection of line frequency related noise, the 1065 is linelocked. The line frequency is sampled and compared to the internal master clock. Synchronisation is achieved by adjusting the master clock frequency.

A sinusoidal line frequency signal from the 5V mains tap is converted to a square-wave (M25-13) and ÷2(M26-1) before being fed to the comparator section of the ULA M23 (sheet 3). The MASTER CLOCK ÷2 signal is fed to ripple counter M27 which outputs a signal of twice the estimated line frequency, for line related periods, controlled by the ULA (M23-18). This signal is fed to M23-19 (via inverter M39) and after a further ÷2, is compared with the actual line frequency (see Fig 3.44).

The ULA determines whether the master clock is running too slow or too fast, producing a signal on pin 20 whose pulse-width is proportional to the difference. The output of pin 21 is a 25Hz square-wave which is fed to the up/down input of counters M41/50. Thus depending on the position and down period of the pulse, the count held is increased or decreased.

Latches M42/51 are updated with this new count during the A-D RESET period and applies the count to resistor network AN4 which forms a D-A converter. Changing the voltage applied to varicap D9 alters its capacitance, thus adjusting the LC of the Colpitts oscillator. Therefore the frequency of the Master Clock is increased or decreased to be an exact multiple of the mains frequency.

3.9 FRONT PCB ASSEMBLY (Circuit Drawing No. 430417)

The Front pcb assembly accepts the measurement signals, digitally displays the value, provides manual control of the measurement circuits and data conditioning, and gives a visual status indication of the selectable instrument states.

3.9.1 Analog Input Signals (430417 sheet 2)

Signals applied to the front panel input terminals are routed directly to the rear panel board by two cables. The first takes the Hi and I+ lines and the second takes the lines Lo and I–. Both cables are screened by Guard.

3.9.2 Display Signals (430417 sheet 1)

The front panel assembly routes the display signals from the Display Driver board to the gas discharge display.

3.9.3 Keyboard Data Encode (430417 sheet 1)

Selection of a front panel keyswitch causes one of the two 16-key encoders (M7 or M10) to send a data available message to M2 (a data latch) and to remember which key was pressed. The output of M2, (pin 1 or 13) signals the interrupt circuitry of the Digital Board (IRQK1 or IRQK2).

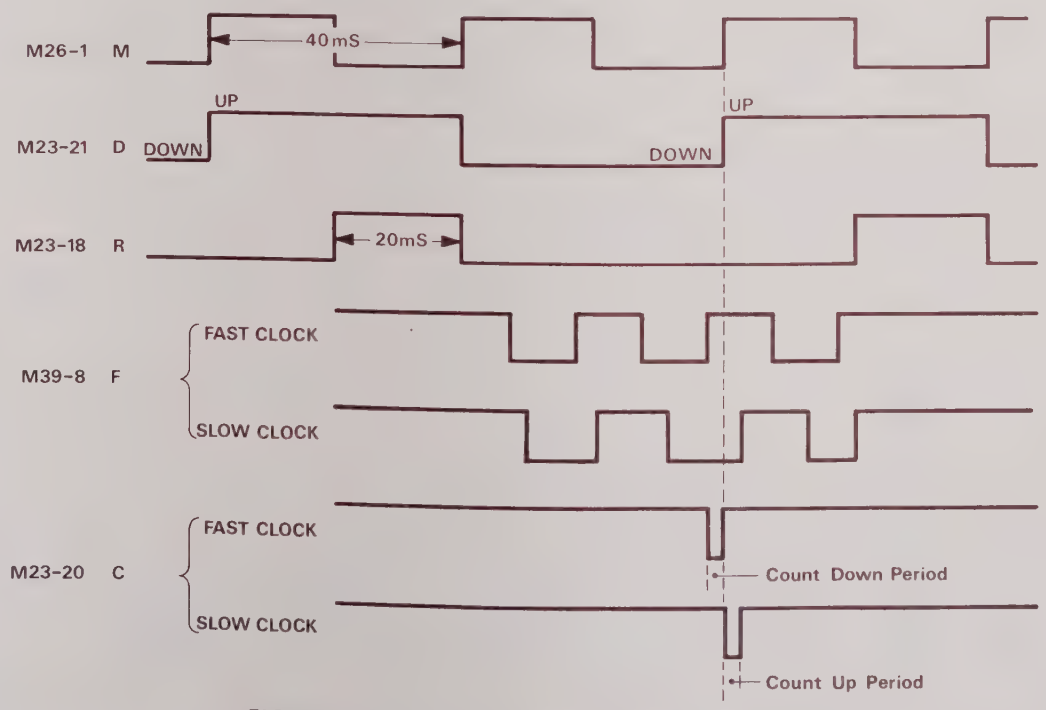


FIG. 3.44 LINE LOCKING TIMING DIAGRAM (50Hz)

KEY	M7			
	14	15	16	17
	CD7	CD6	CD5	CD4
100	0	0	0	0
10	0	0	0	1
1000	0	0	0	1
10MΩ	0	0	1	1
1	0	1	0	0
.1	0	1	0	1
	0	1	1	0
AUTO	0	1	1	0
DC	1	0	0	0
kΩ	1	0	0	1
	1	1	0	1
REAR	1	1	1	0
ZERO	1	1	1	1

KEY	M10			
	14	15	16	17
	CD3	CD2	CD1	CD0
ERROR	0	0	0	0
MAX	0	0	0	1
MIN	0	0	1	0
RESET	0	0	1	1
	0	1	0	0
	0	1	0	1
	0	1	1	0
	0	1	1	1
	1	0	0	0
	1	0	0	1
TEST	1	0	1	0
FILTER	1	1	0	1
AC	1	1	1	1

FIG. 3.45 CMOS DATA BUS : KEY SELECT CODING

When the microprocessor accepts the interrupt and has located the source, the XKY BRD line to pin 13 of M7 and M10 is taken low, enabling the data outputs of the encoders to be placed on to the CMOS data bus (See Fig. 3.45 for the key select coding). This signal also resets M2 ready for the next key selection.

On initialisation or after a change of the instrument's selectable states, the L.E.D. data latches are updated by placing data on the CMOS Data Bus (See Fig. 3.46), firstly to M8 and M5 (enabled from XKD SP1) and 'clocking' from the CMOS CLK line (J2-6), secondly to M12 and M11, then M9 and finally M6 and M4.

3.9.4 Keyboard L.E.D. Data Decode (430417 sheet 1)

The XKY BRD signal is inverted by Q1, R7, C1, R6 partially enabling the L.E.D. data latches M4, M5, M6, M8 and M11 while information is not being extracted from the keyboard encoders. The data latches are divided into four sets, M6 and M4, M8 and M5, and M11, M9 being fully enabled from the XKD SPØ – XKD SP3 lines respectively.

The output of the L.E.D. latches provide the signals to the bases of the L.E.D. drive transistors, switching them on or off as required.

CMOS DATA LINE	M11	M8/M5	M6/M4	M9
CDO		DC	AUTO	
CD1		kΩ		
CD2	RESET	ZERO	.1	
CD3	MIN	FILTER	1	
CD4			10	
CD5			100	TEST
CD6		REAR	1000	MAX
CD7		AC	10MΩ	ERROR

FIG. 3.46 CMOS DATA BUS : LED-SELECT CODING

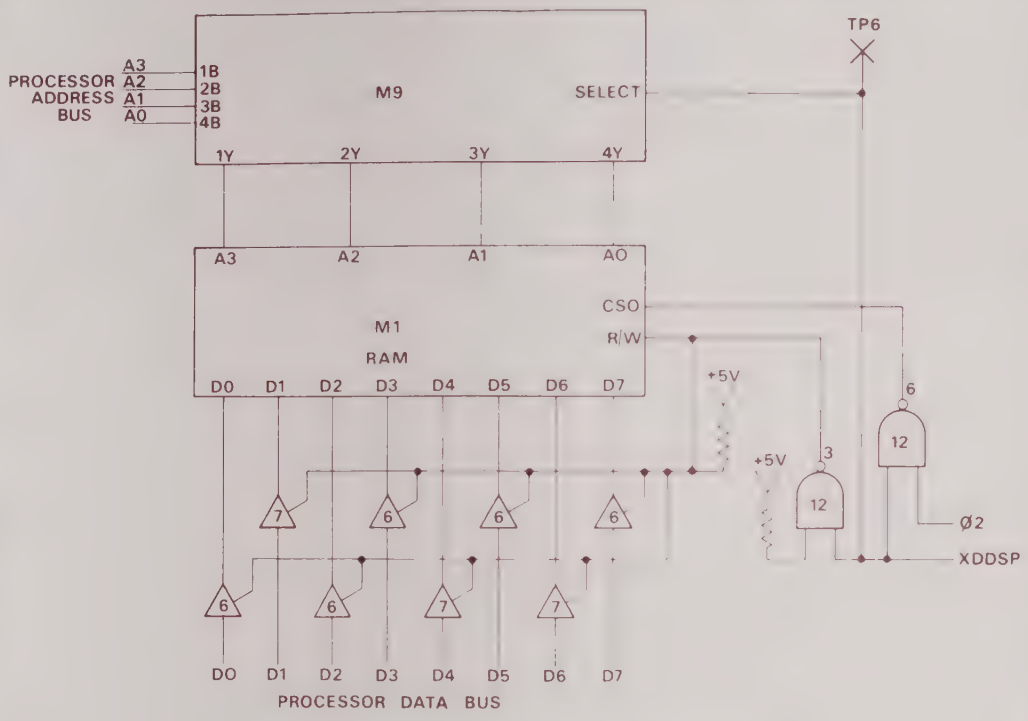


FIG. 3.47 DISPLAY DRIVER WRITE CIRCUITRY

COUNTER (M8)				RAM (M1)				Display block energised or operation implemented from M11
Q_3	Q_2	Q_1	Q_0	A_3	A_2	A_1	A_0	
0	0	0	0	0	0	0	0	1
0	0	0	1	0	0	1	0	3
0	0	1	0	0	1	0	0	5
0	0	1	1	0	1	1	0	7
0	1	0	0	1	0	0	0	9
0	1	0	1	1	0	1	0	11
0	1	1	0	1	1	0	0	
0	1	1	1	1	1	1	0	
1	0	0	0	0	0	0	1	2
1	0	0	1	0	0	1	1	4
1	0	1	0	0	1	0	1	6
1	0	1	1	0	1	1	1	8
1	1	0	0	1	0	0	1	10
1	1	0	1	1	0	1	1	Reset Counter

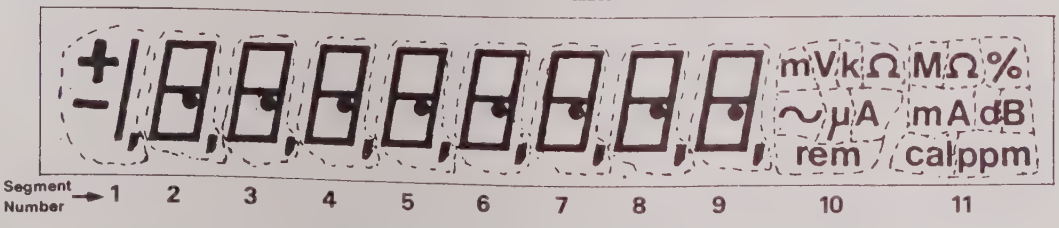


FIG. 3.48 DISPLAY DRIVER READ MODE ADDRESS STATES

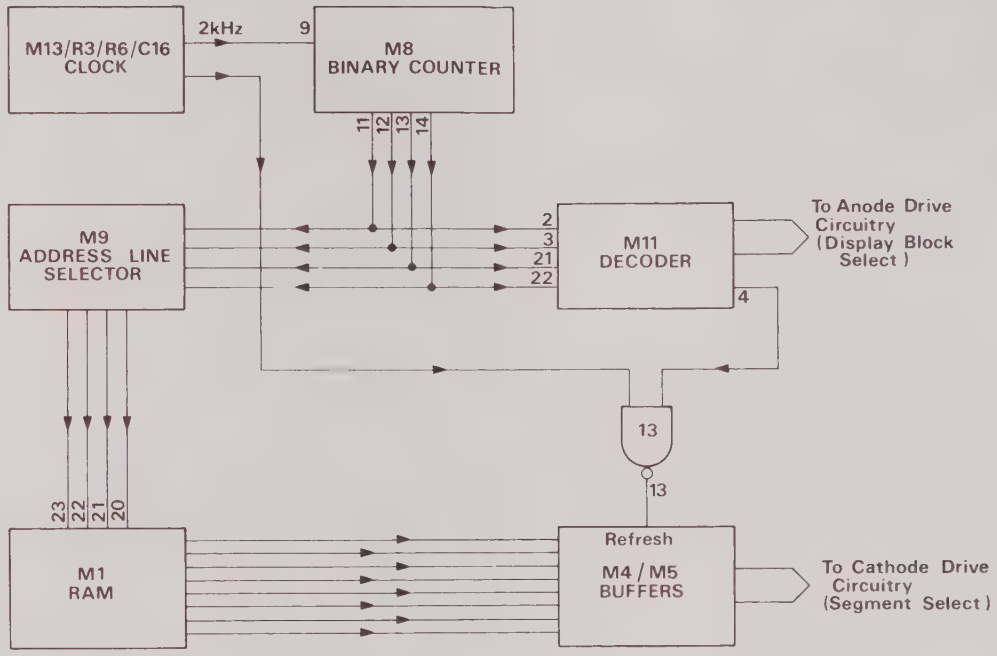


FIG. 3.49 SIMPLIFIED DISPLAY DRIVER READ CIRCUITRY

3.10 DISPLAY DRIVER ASSEMBLY (Circuit Drawing No. 430330).

Basically, the Display Driver assembly receives the display information from the microprocessor (running at 800kHz) and stores it in a Random Access Memory (RAM) digit by digit. This data is then read out at a slower frequency (2kHz), level shifted and output to the gas discharge display.

NOTE: In the following description, each bar, decimal point or legend is referred to as a display segment and each set of segments i.e. ±1, *B* or a legend block, is referred to as a display block.

3.10.1 Write Mode

On completion of a reading or when certain modes are selected, (e.g. ERROR, keyboard entry), the processor indicates to the Display Driver Board that data is ready to be transferred by the signal XDDSP (TP6). This causes the RAM (M1) to be placed into its write mode and the quadruple 2-line to 1-line data selector, M9, to select the 'B' inputs which are connected to the processor address bus.

The signal XDDSP also causes the tri-state buffers M6 and M7 to become enabled, causing the data input lines of the RAM to be connected to the processor data bus. Thus under MPU control, the display data (±1, *B*'s, decimal points and legends) is written into the RAM.

Once this transfer of data is complete the RAM becomes deselected, the buffers return to their third state inhibiting the data bus to the RAM and connects the 'A' inputs of M9 to the address lines of the RAM.

3.10.2 Read Mode

Discharge between adjacent display blocks is prevented by time multiplexing and sending information to alternate blocks. A particular display block is selected by driving the anodes, and a particular segment by driving the cathode.

The free running clock M13, R3, R6, C16, produces a 2kHz signal (M13-9) to drive a 4-bit binary counter, M8, which provides the control of the address lines in the read mode (See Fig. 3.49). The display block selection is achieved by decoding these 4 lines into 16 bits using M11. The output lines of M11 are connected to the bases of transistors Q1-Q3, Q13-Q20 which act as anode switches. Note that when the address lines are in the state 0000 the output of M11 (pin 11) selects the anode to block 1, 0001 selects the anode to block 3 (M11-9), 0010 ... block 5, etc., thus the display blocks are selected alternately.

To select the appropriate segment data from the RAM to match the display block selection the address lines are given a left hand bit rotation, i.e. if the output of M8 is labelled DCBA, (2^3, 2^2, 2^1, 2^0), the address input of M1 would be CBAD. (Fig. 3.48 gives the state of the address lines for each display block). The particular display block segment data is recalled by the RAM, buffered by M4 and M5, level shifted –180 volts by R8-R15, C4-C11 causing Q5-Q12 to drive the cathodes, D1-D10 acting as restoration diodes. Between the transfer of each set of segment data, M13-3 is taken high, causing the outputs of M4 and M5 to be a logic '0'. This produces a refresh period for capacitors C4-C11 to discharge from the –180V supply through the restoration diodes.

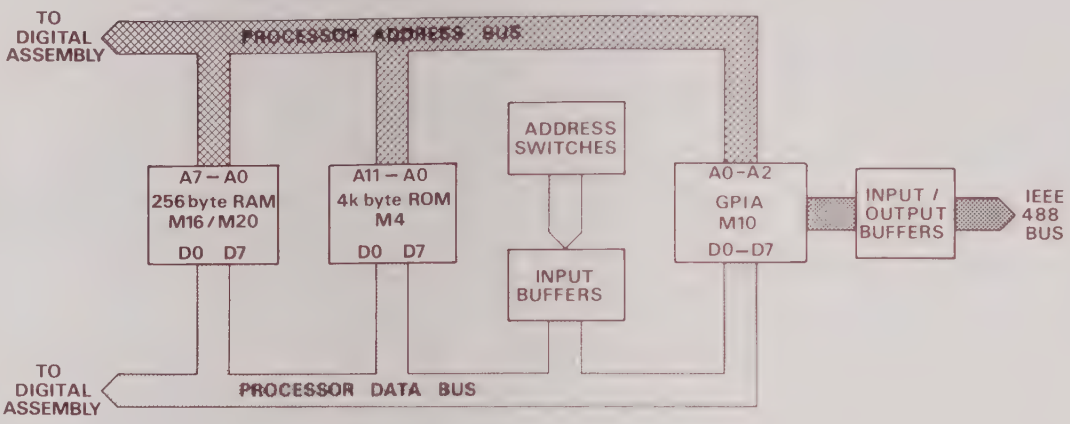


FIG. 3.50 SIMPLIFIED DIAGRAM OF IEEE ASSEMBLY

3.11 IEEE 488 STANDARD DIGITAL INTERFACE (Circuit Drawing No. 430306)

The IEEE Digital Interface assembly contains the extra memory and circuitry required for the execution and decoding of interface functions, and to perform data input/output transfers. Simplified diagram Fig. 3.50 shows the essential features of this board.

3.11.1 RAM/ROM Circuit

The IEEE Digital Interface assembly acts as an extension to the Digital assembly with connections to both the Processor Address and Data Buses. The board contains 4k bytes of program memory (M4) containing the subroutines to control the instrument from the IEEE 488 Bus. Extra 'Operating ('scratch pad') Memory' is provided by two 256 x 4 bit RAMS (M16, M20). Both the ROM and the RAM's receive the address information, with chip selection being made by decoding address lines A3-A11 with XIOBD.

3.11.2 Interface Circuit

The General Purpose Interface Adapter (GPIA). M10, provides the interface between the IEEE 488 Standard Instrument Bus and the 6800 microprocessor. The MPU can receive, process and send messages to the interface through the GPIA.

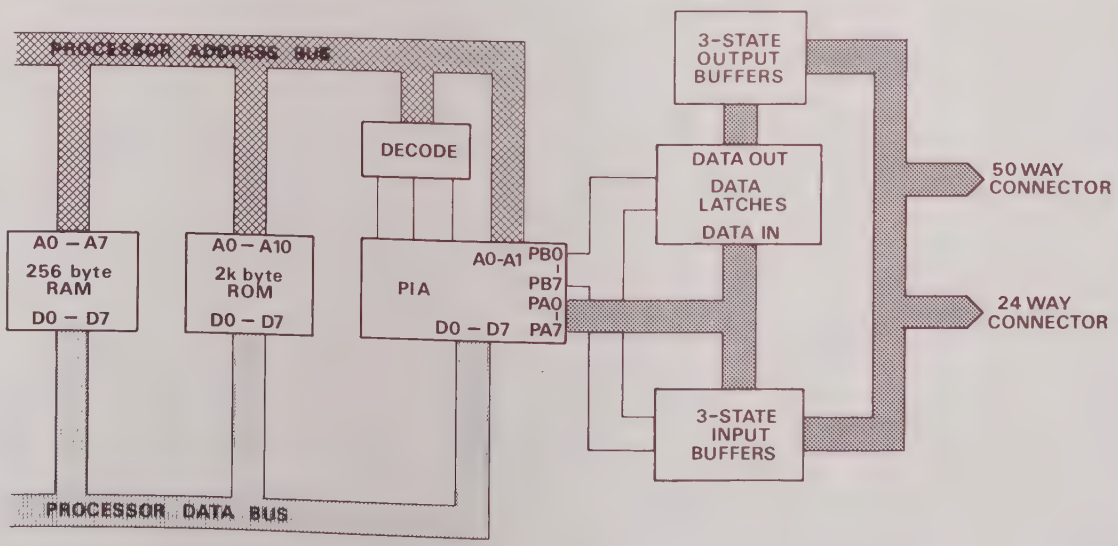


FIG. 3.51 SIMPLIFIED DIAGRAM OF BCD INTERFACE ASSEMBLY

The GPIA is able to automatically handle the following interface protocol[1] :–

Single address capability
Source and acceptor handshake
Talker and Listener states
Service Request
Parallel Poll
Device Clear
Device Trigger

With the MPU it is also capable of:–
Programmable Interrupts
Storing the instrument's address
Control of the interface input/output buffers.

The GPIA is selected by decoding address lines A3-A11 with XIOBD. Address lines A0-A2 with the state of the MPU R/$\overline{W}$ line select one of the 8 read-only or 7 write-only registers in the GPIA, enabling the MPU to send or receive data over the interface.

The two signals T/$\overline{R}$1 and T/$\overline{R}$2 are used to control low power transceivers (formed from M1, 2, 5, 6, 8, 9, 11, 12, 13) which drive the interface bus.

[1] For further information refer to 'Getting aboard the 488 Bus' published by Motorola.

3.13 REAR (POWER SUPPLY) PCB ASSEMBLY (Circuit Drawing No. 430295)

3.13.1 General

The line transformer and power supply components are situated at the rear right hand side of the instrument, when viewed from the front. Transformers T1 and T2 are of toroidal construction mounted one on top of the other and bolted to the rear panel. T1 has a split primary comprising two 115V windings, intended for either series or parallel connection depending on the line voltage. An earth screen is interposed between primary and secondary windings to minimise electrostatic coupling, and is grounded to line earth. The second transformer T2 is driven from T1. It also possesses an electrostatic screen, this time being connected to Guard.

3.13.2 180V Supply

The 180V supply is required for the gas discharge display. Bridge rectifier W1 and C6 convert the 200V AC from the secondary of T1, to DC. R6, D3, D3, R4 and Q2 act as a constant current source being regulated by D4, R5 and Q1. The +5V line (TP2) is connected to the digital +5V line (TP3) on the Display Driver assembly.

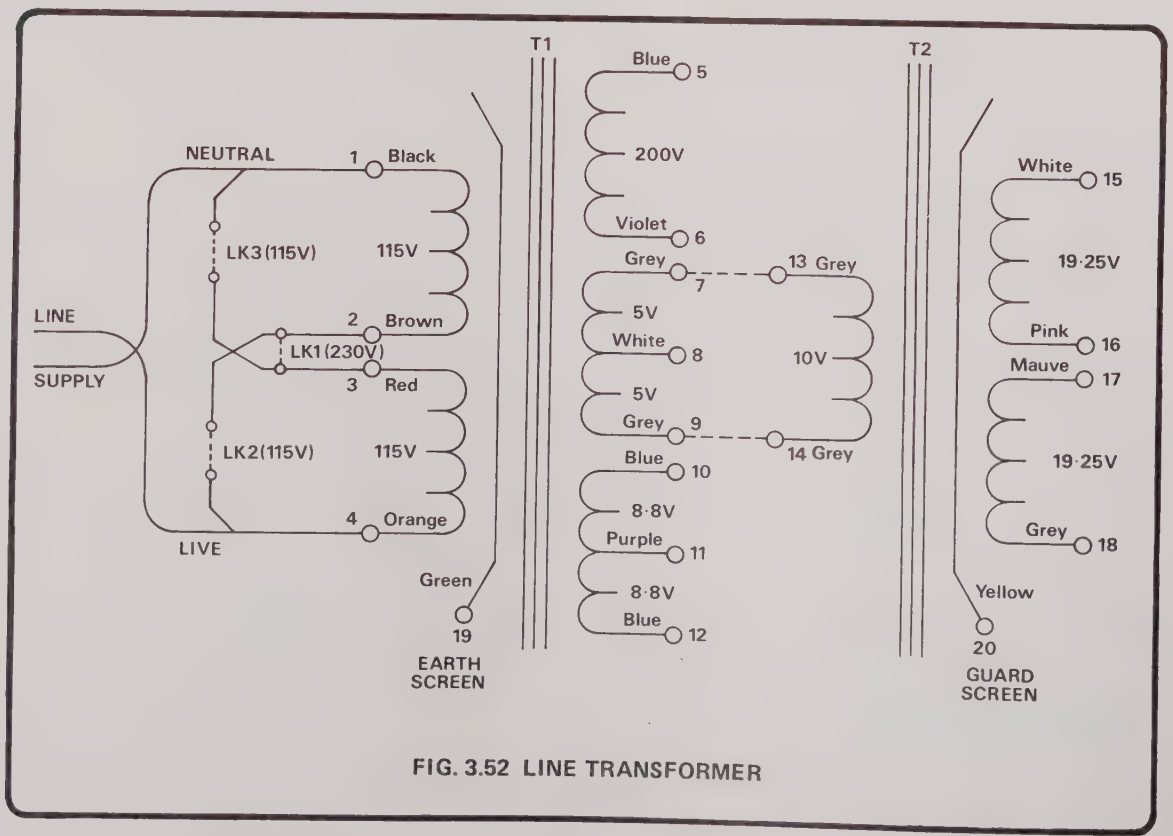


FIG. 3.52 LINE TRANSFORMER

3.13.3 5V Supply

All the logic circuitry to the right of the central printed circuit board is powered from the supply generated from the two 8.8 volt 750mA secondary windings on transformer T1. The centre tap (digital common) is referenced to line earth via a 100kΩ resistor, R1 in parallel with a 100nF capacitor, C1. The output of rectifying diodes D1 and D2 is smoothed by C7 and C8 before being fed to regulator M1. This regulator is capable of 1 amp output and has foldback current limiting and thermal shut-down, to provide short circuit protection.

3.13.4 ±15V Supply

The output of the third secondary winding of transformer T1 (10V AC) is input to the primary of T2. The two 19.25V outputs are connected in series, with the centre tap connected to analog common. The output of bridge rectifier W2 is fed to voltage regulators M2 and M3 (wired in series), to produce positive and negative 15 volt supplies to power the analog circuitry. These regulators also include foldback current limiting and thermal shut-down, to provide short-circuit protection.

3.14 SELF TEST SEQUENCE

Selection of the TEST key places the instrument into a test routine, checking the display and basic measuring circuits. A flowchart for the routine is given in Fig. 3.53. The analog circuitry conditions for each test are given in the last subsection of the circuit description for the particular board, and the range 'F.E.T.' patterns in Appendix 1.

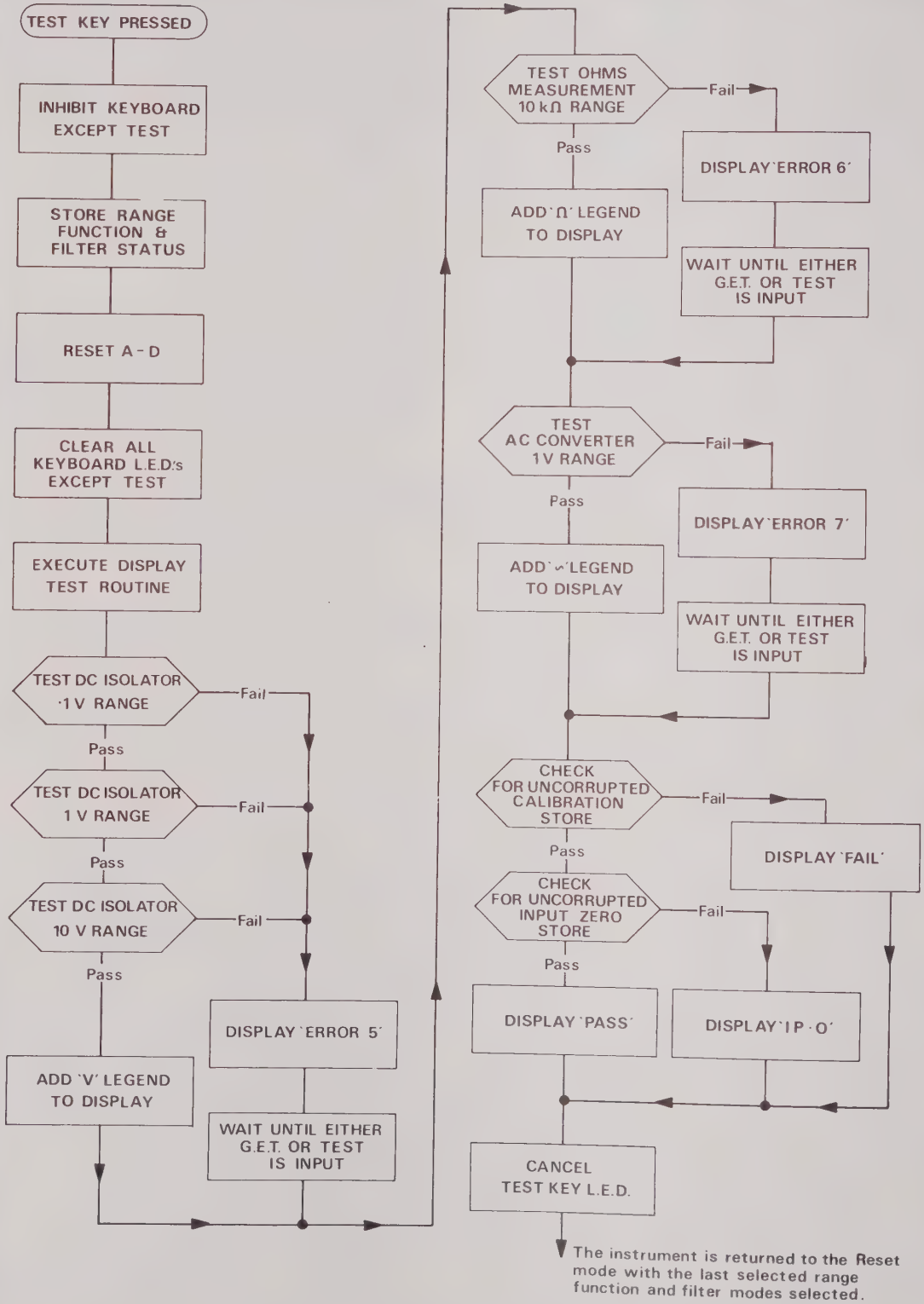


FIG. 3.53 FLOWCHART OF SELF-TEST ROUTINE

SECTION 4

INTERNAL ADJUSTMENT PROCEDURES

4.1 CHANGING LINE VOLTAGE AND FREQUENCY

The instrument is set to 50Hz, 205V to 255V supplies unless otherwise specified on the instrument identification label located on the rear panel. Alteration to a different line voltage/line frequency may necessitate an instrument recalibration.

4.1.1 Changing Line Voltage

1. Disconnect power and all signal input/output leads.
2. Remove the lower cover.
3. Locate the link(s) connecting the split primary on the printed circuit board in front of the toroidal line transformer, Fig. 2.1 and Drawing No 400295.
4. 115V Operation:— Remove LK1 (link 1) and fit LK2 and LK3[1].
   230V Operation:— Remove links LK2 and LK3, and fit LK1[1].
5. Amend instrument identification label.
6. Replace lower cover.
7. Replace power fuses with 160mA anti-surge (230V) or 500mA anti-surge (115V).
8. Carry out the Specification Verification tests (Section 7, User's Handbook and recalibrate if necessary.

4.1.2 Changing Line Frequency

1. Disconnect power and all signal input/output leads.
2. Remove the top cover.
3. 400Hz Operation:— Remove link LK5 and fit LK7[1] on the Digital assembly, (Drawing No. 400422.
   50/60 Operation:— Remove link LK7 and fit LK5[1] on the Digital assembly (Drawing No. 400422).
4. Place instrument into 'Reset'. Adjust L2 (Digital assembly) so that TP7 is 1.05V ±0.03V with respect to Digital Common (TP28).

NOTE: This signal contains about 200mV peak-to-peak high frequency noise.

5. Amend instrument identification label.
6. Replace the top cover.
7. Carry out the Specification Verification tests (Section 7, User's Handbook) and recalibrate if necessary.

[1] Links should be 22 SWG TIN.Cu wire with silicone rubber sleeving.

4.2 BATTERY REPLACEMENT

The battery should be replaced on or before the date indicated on the rear panel instrument identification label. To retain the calibration memory, the instrument must be powered-up during replacement. Therefore great care must be taken due to voltages up to 260 volts being present inside the instrument.

1. Remove top cover and locate battery on the Digital assembly (see Fig. 2.1).
2. Power-up instrument.
3. Desolder battery at end of tags and remove from clip.
4. Replace with new battery, (Datron Part No. 920049) positive terminal to resistor.
5. Replace top cover.
6. Amend instrument identification label (Current date + 5 years).
7. Carry out the Specification Verification tests (Section 7, User's Handbook) and recalibrate if necessary.

4.3 POST-REPAIR PROCEDURES

Apart from the RMS Module (which is available only from Datron), all integrated circuits and semiconductor devices are standard manufacturers' products, and special selection is unnecessary. During manufacture certain resistors are selected in value (FSV = Factory Selected Value) to accommodate circuit component tolerances, or to bring the desired setting of a preset control to the middle of its adjustment range.

The thermal tracking of the DC Preamplifier is particularly important, to ensure a low order of zero drift with variations of temperature. This rather time consuming procedure is carried out initially during manufacture, and need only be repeated following replacement of Q12 or any component associated with the temperature compensation circuitry.

NOTE: A routine calibration as detailed in Section 1 should be carried out after completion of the following procedures.

CAUTION : Up to 260 volts is present inside the instrument. Personal contact with these points may result in injury.

4.3.1 Basic DC Instrument

Equipment Requirements:

4½ digit Digital Voltmeter e.g. Datron 1041
Variable 5V, 1 amp DC supply
5mV/division Oscilloscope e.g. Telequipment D83
10MΩ5% resistor in parallel with 10nF capacitor
DC Voltage Calibrator, e.g. Fluke 332D with correction figures.

Procedure:

Power Supplies

1. Turn instrument on and allow 5 minutes warm-up period.

2. Connect DVM Hi to TP8 and Lo to TP28 on the Digital assembly. Adjust R2 on the Rear (Power Supply) pcb assembly to give +5.100V ±25mV.

3. Connect DVM Hi to TP1 and Lo to TP20 on the Analog assembly. Adjust R7 on the Rear (Power Supply) pcb assembly to give +15.000V ±15mV.

4. Connect DVM Hi to TP2 and Lo to TP20 on the Analog assembly. Adjust R12 on the Rear (Power Supply) pcb assembly to give −15.000V ±15mV.

Digital Assembly

5. Switch the instrument off and disconnect the power lead.

6. Isolate the Digital Board by removing the connectors along the centre panel (J1-J5).

7. Connect variable 5V supply and DVM Hi's to TP8, Lo's to TP28. Reduce supply to 4.750V ±10mV.

8. Set R83 fully clockwise. Connect oscilloscope Lo to TP28 and monitor M35 pin 40. Turn R83 anti-clockwise until TP30 undergoes a high to low transition (or begins to pulse low).

9. Remove variable supply and reconnect items disconnected in steps 5 and 6. Disconnect the oscilloscope. Switch on the instrument.

10. Connect DVM Hi to battery positive terminal, Low to TP28. Check battery voltage is >2.5 volts.

11. Disconnect DVM and connect oscilloscope Hi to TP25, Lo to TP28. Adjust R11 to give a 5mS ±0.5mS period, mark-space ratio approx 100:1.
NOTE: This signal appears in short 'bursts' every reading.

12. Place instrument into 'Reset'. Connect oscilloscope Hi to TP7. Adjust L2 to give a stable +1.05V ±0.03V.
NOTE: This signal contains about 200mV peak to peak high frequency noise.

13. Insert calibration key into keyswitch on the back panel and turn, placing the instrument into CAL mode.
NOTE: The display CAL legend will be lit.

14. Short together pins 'D' and 'E' on Digital assembly.
NOTE: All the calibration store correction factors are now reset to zero.

15. Turn the calibration key back to RUN mode.

Analog Assembly (DC Isolator Section)

16. Centralize R150 and R160.

17. Select 0.1V range DC with 'Filter' out. Apply a 10MΩ resistor between instrument Hi and Lo. Connect DVM Hi to TP13, Lo to TP20.
Adjust FSV R152 with a metal film resistor (50ppm/°C) for a reading of < 10mV, using R159 for 'fine' adjustments.
Do not solder in R152.

18. Apply a short circuit across the input terminals and adjust R150 for a reading of <4mV ±0.1mV at TP13.

19. Connect DVM Hi to TP33 and adjust R160 for a reading of <20μV.

20. Repeat steps 17 to 19 until readings are within specified limits.

21. Select 100V range and apply short circuit between Hi and Lo. Connect DVM Hi to TP7, Lo to TP20. If reading is +6.42V ±0.03V proceed to step 23.

22. Switch off instrument and make positive reference links A to C, if cut i.e. the links alongside TP7. Switch on instrument and measure voltage on TP7 once again. Consult Fig. 4.1 and cut links as indicated. Repeat step 21.

Voltage on TP7 or TP8	TL'B'	TL'C'
6.42	–	–
6.47	–	✓
6.525	✓	–
6.58	✓	✓

Select voltage closest to measured value and cut links

FIG 4.1 REFERENCE SELECTION VOLTAGES

23. Connect DVM Hi to TP8. If reading is −6.42V ±0.03V proceed to step 25.

24. Switch off instrument and make negative reference links B and C, if cut i.e. the links alongside TP8. Switch on instrument and measure voltage on TP8 once again. Consult Fig. 4.1 and cut links as indicated. Repeat Step 23.

25. Select 'Reset'. Connect DVM Hi to TP9. Select correct resistance value for FSV R11 or R15 to give a reading of 0V ±1mV. Solder in resistor.

26. Deselect 'Reset' and disconnect DVM. Select 1000V range and apply −100mV. Connect oscilloscope Lo to TP21, Hi to TP5. Adjust R20 for noisy waveform at zero point.

27. Remove oscilloscope. Replace covers but do not replace screws. Select 10V, DC, filter out and apply s/c across input terminals. Turn rear panel keyswitch to CAL mode and select LIN.

28. Select 10V range, 'Filter' and apply short copper link across input terminals. Select 'Zero'.

29. Apply +10 volts and select GAIN. Repeat until display reads +10.0000 ± ½ digit.

30. Apply +19 volts. If the display reads within the limits +18.9999 to +19.0001, proceed to step 32.

31. Calculate E = (19 - displayed reading)/2.
Re-apply +10 Volts and adjust R23 for a displayed reading of 10 - E.
Repeat steps 29-31 until both readings are within the limits indicated.

32. Turn rear panel keyswitch to RUN mode.

The basic DC only instrument set-up procedure is complete.

4.3.2 Ohms Assembly

Equipment Required :

5½ digit Digital Voltmeter e.g. Datron 1051 or 1061.
10MΩ5% resistor in parallel with 10nF capacitor.
Copper shorting links.

Procedure

1. Centralize R26 and R27.

2. Select kΩ, 10kΩ range and Rear and use the rear panel input. Connect I− to Ω GUARD, I+ to Hi and 10MΩ between Hi and Lo. Connect DVM Hi to TP4, Lo to TP1. Adjust R26 for zero ± 300μV.

3. Remove 10MΩ resistor and replace with a short circuit. Connect DVM Hi to TP14 and adjust R27 for zero ± 2μV.

4. Repeat steps 2 and 3 until readings are within specified limits.

The basic Ohms set-up procedure is complete.

4.3.3 AC Assembly

Equipment required:

4½ digit Digital Voltmeter e.g. Datron 1041.
5mV/division Oscilloscope e.g. Telequipment D83.
AC Calibrator e.g. Fluke 5200A.
5:1 asymmetric crest factor signal, 1 volt r.m.s., 0.02% accuracy.

Procedure

1. Select AC 1000V range and HOLD. Short Hi to Lo. Connect DVM Hi to TL7, Lo to TP8 and note reading. Select 1V range and adjust R121 (bias current) to give same reading ±10μV.

2. Select 1V range, AC + DC and adjust R112 (offset adjust) for an indication of zero ±50μV on the DVM.

3. Repeat steps 1. and 2. until readings are within the specified limits.

4. Select 10V range and HOLD. Connect oscilloscope Hi to TP5, Lo to TP8 and adjust R90 (rectifier zero) for maximum noise about zero. Remove the oscilloscope.

5. Connect DVM Hi to TP2, Lo to TP8 and adjust R75 (linearity) for an indication on the DVM of 5mV ±10%.

6. Select AC, 1V range, FILTER and apply 1V 500Hz. Connect DVM Hi to TL5, Lo to TP8. If reading is +3.157V ±0.01V proceed to step 8.

7. Disconnect input signal and switch off instrument, Make links TL1 to TL4 if cut. Switch on instrument, reselect AC, 1V range, FILTER and reapply 1V, 500Hz. Measure voltage on TL5. Consult Fig. 4.2 and cut links as indicated. Check voltage on TL5 is 3.157V ±0.01V. Remove the DVM.

Voltage on TL5	TL1	TL2	TL3	TL4
3.157	–	–	–	–
3.178	–	–	–	✓
3.198	–	–	✓	–
3.218	–	–	✓	✓
3.239	–	✓	–	–
3.259	–	✓	–	✓
3.280	–	✓	✓	–
3.300	–	✓	✓	✓
3.320	✓	–	–	–
3.340	✓	–	–	✓
3.360	✓	–	✓	–
3.380	✓	–	✓	✓
3.400	✓	✓	–	–
3.420	✓	✓	–	✓
3.440	✓	✓	✓	–
3.460	✓	✓	✓	✓

Select voltage closest to measured value and cut links

FIG 4.2 AC BOARD OUTPUT SELECTION VOLTAGES

8. Deselect HOLD and short circuit instrument Hi and Lo. Turn rear panel key switch to CAL mode and select ZERO. Repeat for all ranges.

9. Select 1V range. Apply 1 volt (d.c.) and note reading on display. Apply −1 volt (d.c.) and adjust R50 (d.c. turnover) for same display indication ±10 digits.

10. This part of the procedure must be performed with the high frequency compensation voltage, at J1-11/ R57, at −5V ±0.2V.

    a. Select AC 100V range, FILTER and apply 100V, 500Hz. Select GAIN. Apply 100V, 30kHz and adjust C62 for a display of 100.000V ±20 digits.

    b. Select 1V range and apply 1 volt, 500Hz. Select GAIN. Apply 1V 30kHz and adjust C63 for a display of 1.00000 ±20 digits.

11. Apply 1 volt 5:1 crest factor signal. Adjust R35 (crest factor) for a display of 1.00000V ±30 digits.

12. Open circuit input. Turn rear panel key switch to RUN. Select TEST and check for a display of PASS. Turn rear panel key switch to CAL.

13. Select 10V range and apply 10V, 30kHz. Check display is 10.0000V ±1200 digits. Check that the display can be calibrated to 10.0000 ±20 digits by less than 5 presses of the AC Hf key.

14. Select 1000V range and apply 1000V, 500Hz. Select GAIN.

15. Apply 1000V, 25kHz and check display is 1000.00V ±1200 digits. Check that display can be calibrated to 1000.00V ±20 digits by less than 5 presses of the AC Hf key. Remove 1000V and turn rear panel key switch to RUN.

The basic AC set-up procedure is complete.

APPENDIX 1

ANALOG DATA LINE 'F.E.T.' PATTERNS

DC Voltage

Range	DC Isolator							
	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
100mV	0	0	0	0	0	1	1	X
1V	0	0	0	0	1	1	1	X
10V	0	0	0	0	1	0	1	X
100V	0	0	0	0	1	1	0	X
1000V	0	0	0	0	1	0	0	X

AC Voltage

Range	AC assembly							
	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
1V	0	0	1	0	0	0	0	X
10V	0	0	0	1	0	0	0	X
100V	0	0	0	0	1	0	0	X
1000V	0	0	0	0	0	1	0	X

DC Coupled AC Voltage

Range	AC assembly							
	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
1V	0	1	1	0	0	0	0	X
10V	0	1	0	1	0	0	0	X
100V	0	1	0	0	1	0	0	X
1000V	0	1	0	0	0	1	0	X

Ohms

Range	DC Isolator								OHMS assembly							
	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
100Ω	0	0	0	0	0	1	1	X	0	0	0	0	0	1	0	X
1kΩ	0	0	0	0	1	1	1	X	0	0	0	0	0	1	0	X
10kΩ	0	0	0	0	1	1	1	X	1	0	0	0	0	0	0	X
100kΩ	0	0	0	0	1	1	1	X	0	0	0	0	1	0	1	X
1MΩ	0	0	0	0	1	1	1	X	0	0	1	1	1	0	0	X
10MΩ	0	0	0	0	1	1	1	X	0	1	0	1	1	0	0	X

Test

Function Tested	Range Checked	DC Isolator								Other function assembly							
		AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
DC	.1	0	0	0	0	0	1	0	1	None used							
	1	0	0	0	0	1	1	0	1								
	10	0	0	0	0	1	0	0	1								
kΩ	10	0	0	0	0	1	1	1	0	Ohms assembly							
										0	1	0	1	1	0	0	0
AC	1	Not used								AC assembly							
										0	1	1	0	0	0	0	0

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
R1	000104	100K 5% 1/4W CARBON	MULLARD	CR25	1
R2	066200	20R POT 3/8 SQ VERT. CERMET.	BECKMAN	72XW	1
R3	000221	220R. 5% 1/4W CARBON.	MULLARD	CR25	1
R4	014300	430R 1% M.F.	HOLCO	H.8	1
R5	000102	1K 5% 1/4W CARBON	MULLARD	CR25	2
R6	000184	180K 5% 1/4W CARBON	MULLARD	CR25	1
R7	066102	1K 3/8" RIGHT ANGLED CER POT.	BECKMAN	72XW	1
R8	014021	4K02 1% 1/8W M.F.	HOLCO	H.8.	1
R9	019101	9K1 1% 1/8W M.F.	HOLCO	H.8.	1
R10	012001	2K 1% 1/8W M.F.	HOLCO	H.8.	1
R11	011302	13K 1% 1/8W M.F.	HOLCO	H.8.	1
R12	066501	500R 3/8 RIGHT ANGLED CER. POT.	BECKMAN	72XW	1
R13	000102	1K 5% 1/4W CARBON.	MULLARD	CR25	—
L1	370001	10μH 0·85Ω R.F. CHOKE.	PLESSEY	58/10/0011/10	3
L2	370001	10μH " "	"	"	—
L3	370001	10μH " "	"	"	—
C1	110013	0·1μF 10% 250V POLYESTER	MULLARD	C280AE/P100K	1
C2	NOT USED.				
C3	NOT USED.				

NOTES CIRCUIT DIAG. 430295.
CHECK PROC. 460295.
CHECK LIST 470295.

SEE SHEET 2 FOR LATEST ISSUE

ISS	C	D	1	C' 2	3	C 4	5	6
ECO	–	–	RELEASED	ECO 783	ECO 816	882	900	1085 1097
DATE	–	22-8-78	29-9-78	8-12-78	25 JAN 79	6 JUN 79	31-10-79	21 4 80
CHKD	–	NO		NO	NO	NO	NO	NO

DATE 2-5-78
DRAWN B.J.
CHECKED M.L.M.
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TITLE 1061 / 1071 REAR P.C.B. ASSY.

DRAWING NUMBER 400295 SHEET 2 OF 6

W 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
C4		NOT USED			
C5	101103	0·01μF 250V CER DISC	ERIE	801	4
C6	180026	10μF 350V ELECT	ITT	EN12/12 10/350	1
C7	180004	4700μF 16V AL. ELECT	WIMA	PRINTILYT	1
C8	101103	0·01μF 250V CER. DISC	ERIE	801	—
C9	150003	47μF 20% 6V3 DIP. TANT	UNION CARBIDE	K47E6V3	1
C10	150021	22μF 20% 25V DIP. TANT	UNION CARBIDE	K22E25	2
C11	150021	" " " "	"	"	—
C12	101103	0·01μF 250V. CER. DISC.	ERIE	801	—
C13	180025	1000μF 35V ELECT.	WIMA	PRINTILYT	2
C14	101103	0·01μF 250V. CER DISC	ERIE	801	—
C15	180025	1000μF 35V ELECT	WIMA	PRINTILYT	—
C16	102102	1nF 10% 500V CER DISC	ITT	CD10.	1
D1	200010	Si RECTIFIER 3A 100V	INTERNATIONAL RECT.	30S1	2
D2	200010	" " "	"	"	—
D3	210068	6V8 400mW ZENER	MULLARD	BZY88C6V8	1
D4	213004	180V 500mW ZENER	MOTOROLA	1N5279B	1

NOTES

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ECO								
DATE								
CHKD								

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DRAWING NUMBER 400295 SHEET 3 OF 6

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
Q1	240018	300V. N.P.N. TRANSISTOR	MOTOROLA	MJE 340	2
Q2	240018	" " "	"	"	—
M1	260005	5V. 1A. REGULATOR	MOTOROLA	MC7805CP	1
M2	260024	POSITIVE VOLTAGE REGULATOR	FAIRCHILD	μA 78 MGUIC	1
M3	260023	NEGATIVE VOLTAGE REGULATOR	FAIRCHILD	μA 79 MGUIC	1
W1	209014	1A5 400V BRIDGE RECT	MICRO ELECTRONICS	W004	1
W2	209004	100V. 1A. BRIDGE RECT	GENERAL INSTRUMENT	W01	1
J1					
J2	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	5
J3	604032	4 WAY FLAT TIN WAFER PIN	MOLEX	22-27-2041 / TIN	11
J4	604032	" " " " " "		"	—
J5	604033	" " GOLD " " "		" /GOLD.	6.

NOTES

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ISS.														
E.C.O.														
DATE														
CHKD.														

DATE 2-5-78

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CHECKED MLM

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DATE

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TITLE 1061/71 REAR P.C.B. ASSY.

DRAWING NUMBER 400295

SHEET 4 OF 6

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
J6	604032	4 WAY FLAT TIN WAFER PIN	MOLEX	22-27-2041 / TIN	—
J7	604032	" " " " "	"	"	—
J8					
J9	604032	4 WAY FLAT TIN WAFER PIN	MOLEX	22-27-2041 / TIN	—
J10	604032	" " " " "	"	"	—
J11	604033	4 WAY FLAT GOLD WAFER PIN	MOLEX	22-27-2041/GOLD	—
J12	604033	" " " " "	"	"	—
J13	604033	" " " " "	"	"	—
J14					
	410091-5	PRINTED CIRCUIT BOARD			1
	450180-1	HEATSINK 5V	ADVANCE		1
	450183-1	HEATSINK 15V	ADVANCE		3
	540002	22SWG TIN CU WIRE			A/R
					—
	611037	SCREW M3 x 8mm. NYLON HEX. HD.	NYLON ALLOYS		9
	613005	WASHER. M3 INT/SHAKEPROOF. ST.	GKN DISTRIBUTORS		4
	613017	WASHER M3 FLAT NYLON	NYLON ALLOYS		9
	615002	NUT. M3 FULL HEX STEEL	GKN	ZINC PLATED	2
	615008	NUT. M3 FULL HEX NYLON	GKN		3

NOTES.

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ISS.														
E.C.O.														
DATE														
CHKD.														

DATE 2-5-78

DRAWN B.J.

CHECKED MLM

APPROVED

DATE

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TITLE 1061/71 REAR P.C.B. ASSY

DRAWING NUMBER 400295

SHEET 5 OF 6

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
	611016	SCREW M3 x 8mm STEEL PO2 PAN ZINC PL.	GKN		4
	618007	MELINEX WASHERS 12·7 x 16·5 x 0·05 mm.	JERMYN.	J26-5001	3
	590004	SLEEVE - PTFE	HELLERMANN ELECTRIC	FE 10	A/R.
	900004	SILICONE RUBBER COMPOUND	R.S.	554-119	A/R
	420080-1	WARNING LABEL			2

NOTES

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DATE	2-5-78	datron ELECTRONICS LTD		
DRAWN	B.J.	TITLE	1061/71 REAR P.C.B ASSY	
CHECKED		DRAWING NUMBER	400295	SHEET 6 OF 6
APPROVED				
DATE				

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
J2	572130/B.	16 WAY RIBBON CABLE ASSY	DATRON.		1
J3	604035	4CCT. RIGHT ANGLED WAFER. GOLD.	MOLEX.	22-12-2041.	5
J4	604035	" " " "	"	"	—
J6	604035.	" " " "	"	"	—
	410092-3A	P.C.B.			1
	540002	22SWG TIN CU. WIRE			A/R
J1 & J5	604036	STRIP OF 10 AMP PINS	AMP	163740-8	4
	630023	SCOTCHFLEX ADHESIVE CLIP	3M	CLIP 706	1
	630099	25mm MASKING TAPE	3M	SCOTCH N.230	A/R
R1	000473	47K 5% ¼W CARBON	MULLARD	CR25	2
R2	000473	47K " " "	"	"	—
D1	200002	Si RECTIFIER 1A 50V	FAIRCHILD	1N4001	2
D2	200002	" " " "	"	"	—

NOTES. CIRCUIT DIAGRAM . 430296
CHECK PROC. . 460296.
CHECK LIST . 470296.

SEE SHEET 2 FOR LATEST ISSUE

ISS	C	D	1	2	3	4	5	6	7
ECO	—	—	DELEATED	ECO784	ECO849	867/904	992	1000	1102
DATE	—	25-8-78	29-9-78	6-12-78	4-5-79	11-6-79	25-10-79	18.1.80	14.4.80
CHKD	—	MD		MD	MD	MD	MD	MD	MD

DATE	2-5-78	datron ELECTRONICS LTD	
DRAWN	B.J.	TITLE	1061/71 CENTRE P.C.B. ASSY
CHECKED		DRAWING NUMBER	400296
APPROVED			SHEET 2 OF 2
DATE			

IW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
J2	604035	Right Angled Wafer Pin. Gold	MOLEX	22-12-2041	12
J3	604035	" - " - "	"	"	—
J4	604035	" - " - "	"	"	—
J5	604035	" " " - "	"	"	—
J6	604035	" " " - "	"	"	—
	410093-4	Printed Circuit Board			1
	510111	7/0·2 Brown Wire			120 mm
J1 & J7	604036	Strip of 10 AMP Pins	AMP	163740-8	2
	605053	12 way Polarised Socket	MOLEX	22-01-2125	2
	605057	Gold Crimp Pins	MOLEX	4809-GL	7
	606004	Plastic Polarising Peg	MOLEX	4161-1	4
	540002	22 S.W.G. Tin. Cu. Wire			A/R
	590001	Sleeve Max Cable Ø3·0	HELLERMANN ELECTRIC	H15 x 20mm BLK HELSYN	1

NOTES. CIRCUIT DIAGRAM - 430297.
CHECK PROC. - 460297
CHECK LIST - 470297.
SEE SHEET 2 FOR LATEST ISSUE

ISS	C	D	1	2
ECO	-	-	RELEASED	867
DATE	-	24-8-78	29-9-78	11-6-79
CHKD	-	MD		MD

DATE 28-4-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061/71
L.H. P.C.B ASSEMBLY

DRAWING NUMBER 400297

SHEET 2 OF 2

I.W 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	000334	330K 5% 1/4W CARBON	MULLARD	CR25	2
R2	000334	" " " "	"	"	—
	410094-4	P.C.B.			1
	540002	22 S.W.G. TIN. CU. WIRE.			A/R
J2	400365	24 way Ribbon Cable Assy	DATRON		1
J1 & J3	604036	Strip of 10 AMP Pins	AMP	163740-8.	4
	590001	Sleeve Max Cable Ø3·0	HELLERMANN ELECTRIC	H15x20mm BLK. HELSYN	2
	630099	25mm Masking Tape.	3M	SCOTCH N.230	A/R

NOTES CIRCUIT DIAGRAM - 430298
CHECK PROC. - 460298
CHECK LIST - 470298
SEE SHEET 2 FOR LATEST ISSUE

ISS	C	D	1	2	3	4
ECO	-	-	RELEASED	ECO 850	867/901	943
DATE	-	24-8-78	29-9-78	4-5-79	11-6-79	10.9.79
CHKD	-	MD		MD	MD	

DATE 28-4-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061/71.
R.H. P.C.B. ASSEMBLY

DRAWING NUMBER 400298

SHEET 2 OF 2

I.W 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	000104	100K. 5%. ¼W CARBON.	MULLARD	CR25	6
R2	000104	100K. " " "	"	"	—
R3	000104	100K " " "	"	"	—
R4	000104	100K " " "	"	"	—
R5	000103	10K " " "	"	"	2
R6	000104	100K " " "	"	"	—
R7	000104	100K " " "	"	"	—
R8	000103	10K " " "	"	"	—
AN1	090017	100K x 7. 2%. NETWORK.	BECKMAN	764-1-R100K	3.
AN2	090017	100K x 7. " "	"	"	—
AN3	090017	100K x 7. " "	"	"	—

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS	A	1 C	2	3
E.C.O		—	1008	1000,1052
DATE	25.4.79	18 MAY 79	26 OCT 79	18.1.80
CHKD			MD	MD

DATE 25 APRIL 79
DRAWN W.G.SMITH
CHECKED G.e.M
APPROVED
DATE 18 MAY 79

datron ELECTRONICS LTD

TITLE I EEE 488 OPTION.

DRAWING NUMBER 400306

SHEET 2. OF 5.

J W 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C1	150012	100nF 20% 35V DIP TANT	UNION CARBIDE	K100E35	1
C2	150016	1μF 20% 35V DIP TANT	" "	K1R0E16	1
C3	101103	10nF 25% 250V CER DISC	I.T.T.	CD10	1
C4	150015	10μF 20% 35V DIP TANT	UNION CARBIDE	K10E35	4
C5	150015	10μF 20% 35V DIP TANT	" "	K10E35	—
C6	150015	10μF 20% 35V DIP TANT	" "	K10E35	—
C7	150015	10μF 20% 35V DIP TANT	" "	K10E35	—
M1	270049	QUAD BUS TRANSCEIVER	MOTOROLA	MC3446	4
M2	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503 BCP	7
M3	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503 BCP	—
M4		TO BE FITTED AT FINAL ASSY STAGE			—
M5	270049	QUAD BUS TRANSCEIVER	MOTOROLA	MC3446	—
M6	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503 BCP	—
M7	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503 BCP	—
M8	270049	QUAD BUS TRANSCEIVER	"	MC3446	—
M9	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503 BCP	—
M10	280064	I.E.E.E 488 INTERFACE CHIP	"	MC68488P	1
M11	270049	QUAD BUS TRANSCEIVER	"	MC3446	—
M12	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503 BCP	—

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS													
E.C.O													
DATE													
CHKD													

DATE 25 APRIL 79
DRAWN W.G.SMITH
CHECKED G.e.M
APPROVED
DATE 18 MAY 79

datron ELECTRONICS LTD

TITLE I.E.E.E 488 OPTION

DRAWING NUMBER 400306

SHEET 3 OF 5

J W 1.44

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
M13	280024	TRI-STATE HEX NON-INV BUFFER	MOTOROLA	MC14503 BCP	—
M14	270050	HEX INVERTER	FAIRCHILD	F74LS04	1
M15	270055	DUAL 4 INPUT NAND	"	74LS20	2
M16	280066	256×4 BIT STATIC CMOS RAM	HARRIS	6501-9	2.
M17	280068	DUAL MONOSTABLE MULTIVIBRATOR	MOTOROLA	MC14538 BCP	1
M18	270055	DUAL 4 INPUT NAND	FAIRCHILD	74LS20	—
M19	270051	DUAL 4 INPUT AND	"	74LS21	1
M20	280066	256×4 BIT STATIC CMOS RAM	HARRIS	6501-9	—

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE 25 APRIL 79

DRAWN W.G.SMITH

CHECKED G.C.M

APPROVED

DATE 18 MAY 79

datron ELECTRONICS LTD

TITLE I.E.E.E. 488 OPTION.

DRAWING NUMBER 400306

SHEET 4 OF 5

JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	400379/1	WIRE/TERMINAL ASSY			2
	410101-4	PRINTED CIRCUIT BOARD			1
	540002	22 SWG TINNED COPPER WIRE			A/R
	590004	SLEEVE — PTFE	HELLERMANN ELECTRIC	FE10	A/R
J2	605002	16 WAY LOW PROFILE SOCKET	JERMYN/ANTIFERENCE	A23-2001/Y OR ICN 163-536	1
	605037	14 WAY D.I.L. SOCKET	ASTRALUX	I.C.L-143-53T	4.
	605038	16 WAY D.I.L SOCKET	"	I.C.L-163-56T	12.
	605050	40 WAY D.I.L. SOCKET. LOW PR'FLE.	AUGAT	340-AG39D	1
J4	605051	4 WAY POLARISED SOCKET	MOLEX	(22-01-2045) 6471-4-1	1
	605063	22 WAY D.I.L. SOCKET	AUGAT	322-AG39D	2.
J1&J3.	605064	24 WAY D.I.L. SOCKET	"	324-AG39D	3
	606005	SOCKET CLIP	ANTIFERENCE	RC-74	1
	617010	NYLATCH PLUNGER HN3P	RICHO	HN3P-32-4-1	6
	617011	NYLATCH GROMMET HN3G	"	HN3G-32-1	6
	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE 25 APRIL 79.

DRAWN W.G.SMITH

CHECKED G.C.M

APPROVED

DATE 18 MAY 79.

datron ELECTRONICS LTD

TITLE I.E.E.E. 488 OPTION.

DRAWING NUMBER 400306

SHEET 5 OF 5

JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R1	000472	4k7 5% ¼W CARBON	MULLARD	CR25	3
R2	000103	10k " " "	"	"	2
R3	000183	18k " " "	"	"	1
R4	000103	10k " " "	"	"	–
R5	000104	100k " " "	"	"	1
R6		NOT USED			–
R7		NOT USED			–
R8	000102	1k 5% ¼W CARBON	MULLARD	CR25	19
R9	000102	1k " " "	"	"	–
R10	000102	1k " " "	"	"	–
R11	000102	1k " " "	"	"	–
R12	000102	1k " " "	"	"	–
R13	000102	1k " " "	"	"	–
R14	000102	1k " " "	"	"	–
R15	000102	1k " " "	"	"	–
R16		NOT USED			–
R17		NOT USED			–
R18	000102	1k " " "	"	"	–
R19	000102	1k " " "	"	"	–
R20	000102	1k " " "	"	"	–
R21		NOT USED			–
R22	000272	2k7 5% ¼W CARBON	"	"	5
R23	000472	4k7 " " "	"	"	–

NOTES. CIRCUIT DIAGRAM = 430330
CHECK PROCEDURE = 460330
CHECK LIST = 470330

SEE SHEET 2 FOR LATEST ISSUE

ISS	C	1	2	3	4	5	6
ECO	–	–	789	822	854	904	1008 1025
DATE	2.5.78	29.9.78	17 NOV 78	20 FEB 79	10 MAY 79	21.6.79	3-1-80
CHKD	–	DAV	MJD		ND	ND	

DATE 2 5 78
DRAWN IL
CHECKED MJD
APPROVED
AT

datron ELECTRONICS LTD

TITLE 1061 DISPLAY DRIVER PCB. ASSY.

DRAWING NUMBER 400330 SHEET 2 OF 7

J W 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
R24	000272	2k7 5% ¼W CARBON	MULLARD	CR25	–
R25	000272	2k7 " " "	"	"	–
R26	000272	2k7 " " "	"	"	–
R27	000182	1k8 " " "	"	"	1
R28	000222	2k2 " " "	"	"	1
R29	000272	2k7 " " "	"	"	–
R30	000102	1k " " "	"	"	–
R31	000102	1k " " "	"	"	–
R32	000102	1k " " "	"	"	–
R33	000102	1k " " "	"	"	–
R34	000102	1k " " "	"	"	–
R35	000102	1k " " "	"	"	–
R36	000102	1k " " "	"	"	–
R37	000102	1k " " "	"	"	–
R38	000472	4k7 " " "	"	"	–
R39	000393	39k " " "	"	"	1
R40		NOT USED			–
R41	000563	56K 5% ¼W CARBON	MULLARD	CR25	1
C1	150020	10uF 20% 25v DIP TANT	UNION CARBIDE	K10E25	3
C2		NOT USED			–
C3		NOT USED			–

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS													
ECO													
DATE													
CHKD													

DATE
DRAWN
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 DISPLAY DRIVER PCB. ASSY.

DRAWING NUMBER 400330 SHEET 3 OF 7

DESIGNATOR	[illegible]	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
C4	110013	0·1μF 20% 250v POLYESTER	MULLARD	C280AE/P10K	8
C5	110013	" " " "	"	"	–
C6	110013	" " " "	"	"	–
C7	110013	" " " "	"	"	–
C8	110013	" " " "	"	"	–
C9	110013	" " " "	"	"	–
C10	110013	" " " "	"	"	–
C11	110013	" " " "	"	"	–
C12		NOT USED			–
C13	110005	0·01μF 20% 250v "	"	C280AE/P10K	3
C14	150020	10μF. 20% 25v. DIP. TANT	UNION CARBIDE	K10E25	–
C15	110005	0·01μF 20% 250v POLYESTER	MULLARD	C280AE/P10K	–
C16	110005	0·01μF 20% 250v POLYESTER	MULLARD	C280AE/P10K	–
C17	150020	10μF 20% 25v DIP. TANT	UNION CARBIDE	K10E25	–
C18	180019	10μF 20% 250v AL ELECT	I.T.T.	JF10-100S 250AA	1
D1		NOT USED			–
D2		NOT USED			–
D3		NOT USED			–
D4	200001	DIODE Si GP	FAIRCHILD	IN4148	8
D5	200001	" " "	"	"	–
D6	200001	" " "	"	"	–

datron ELECTRONICS LTD

1061 DISPLAY DRIVER PCB. ASSY

DRAWING NUMBER 400330 4 SHEET 7

DESIGNATOR	[illegible]	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
D7	200001	DIODE Si GP	FAIRCHILD	IN4148	–
D8	200001	" " "	"	"	–
D9	200001	" " "	"	"	–
D10	200001	" " "	"	"	–
D11	200001	" " "	"	"	–
D12	213005	DIODE ZENER 7.5 V. ½W	MOTOROLA	BZX79C7.5	1
Q1	250009	Si PNP TRANSISTOR	NATIONAL	2N5401	11
Q2	250009	" " "	"	"	–
Q3	250009	" " "	"	"	–
Q4		NOT USED			–
Q5	240009	Si NPN TRANSISTOR		MPS L01	8
Q6	240009	" " "	"	"	–
Q7	240009	" " "	"	"	–
Q8	240009	" " "	"	"	–
Q9	240009	" " "	"	"	–
Q10	240009	" " "	"	"	–
Q11	240009	" " "	"	"	–
Q12	240009	" " "	"	"	–
Q13	250009	" PNP "	"	2N5401	–
Q14	250009	" " "	"	"	–
Q15	250009	" " "	"	"	–
Q16	250009	" " "	"	"	–

DATE	datron ELECTRONICS LTD
DRAWN	TITLE 1061 DISPLAY DRIVER PCB. ASSY.
CHECKED	
APPROVED	
DATE	DRAWING NUMBER 400330 SHEET 5 OF 7

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
Q17	250009	Si PNP TRANSISTOR	NATIONAL	2N5401	–
Q18	250009	" " "	"	"	–
Q19	250009	" " "	"	"	–
Q20	250009	" " "	"	"	–
M1	280062	128 × 8 BIT STATIC RAM	MOTOROLA	MC6810	1
M2		NOT USED			–
M3		NOT USED			–
M4	280023	QUAD 2 I/P NOR GATE	"	MC14001BCP	2
M5	280023	QUAD 2 I/P NOR GATE	"	"	–
M6	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503BCP	2
M7	280024	" " " " "	"	"	–
M8	280059	DUAL BINARY UP COUNTER	"	MC14520BCP	1
M9	270045	QUAD 2-1 DATA SELECT LS TTL	NATIONAL	SN74LS157	1
M10		NOT USED			–
M11	280043	4 BIT LATCH/4 TO 16 LINE DECODER	MOTOROLA	MC14515BCP	1
M12	270048	QUAD 2 I/P NAND LS TTL	NATIONAL	SN74LS00	1
M13	280077	HEX GATE	MOTOROLA	MC14572	1
AN2- AN4	090065	330K ±1. 2% RESISTOR NETWORK	BECKMAN	764-1-R330K	3

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE
DRAWN
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 DISPLAY DRIVER PCB. ASSY.

DRAWING NUMBER 400330 SHEET 6 OF 7

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
J1	605002	16 WAY DIL LOW PROFILE SKT.	JERMYN OR ANTIFERENCE	A23-2001/Y OR ICN-163-S3	1
J2	605064	24 WAY DIL SKT. TIN PLATE	AUGAT	324-AG39D	3
	605037	14 WAY DIL SOCKET	ASTRALUX OR JERMYN	ICL143-S3T	3
	605038	16 WAY DIL SOCKET	" "	ICL163-S6T	5
	605064	24 WAY DIL SKT. TIN PLATE	AUGAT	324-AG39D	–
TP1-TP6	540002	22 SWG BTC WIRE			A/R
	590004	SLEEVE – PTFE	HELLERMANN ELECTRIC	FE10	A/R
	410097-5A	PCB			1
	617010	NYLATCH - PLUNGER	ORDER FROM C.J. FOX & SONS	HN3P-32-4-1	4
	617011	NYLATCH - GROMMET	" " " "	HN3G-32-1	4
	606005	CLIP FOR SOCKET 605002	ANTIFERENCE	RC-74	1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE
DRAWN
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 DISPLAY DRIVER PCB. ASSY.

DRAWING NUMBER 400330 SHEET 7 OF 7

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	090001	P.T.C. THERMISTOR	MULLARD	VA8650	2
R2	090001	P.T.C. THERMISTOR	MULLARD	VA8650	—
R3	000151	150Ω 1/4 W CARBON	MULLARD	CR25	9
R4	000151	150Ω " - "	"	"	—
R5	000151	150Ω " - "	"	"	—
R6	000102	1K 1/4 W. CARBON	"	CR25	1
R7	000104	100K 1/4 W. CARBON	MULLARD	CR25	1
R8	000151	150Ω 1/4 W CARBON	MULLARD	CR25	—
R9	000151	150Ω " - "	"	"	—
R10	000151	150Ω " " "	"	"	—
R11	000151	150Ω " " "	"	"	—
R12	000151	150Ω " " "	"	"	—
R13	000151	150Ω " " "	"	"	—
R14	008014	10M 5% 2500v MET-GLAZE	"	VR37	1
AN1	090032	150R x7 2% NETWORK	BECKMAN	764-1-R150	1
C1	102101	100PF CER DISC	ERIE	801	1
C2	150002	10μF 20% 16V DIP TANT	UNION CARBIDE	K10E16	2
C3	150016	1.0 μF 20% 35V "	UNION CARBIDE	KIR0E35	2
C4	101103	0.01μF 250v CER DISC	ERIE	801	3

NOTES. CIRCUIT DIAG 430417
CHECK PROC. 460417
CHECK LIST 470417
SEE SHEET 2 FOR LATEST ISSUE

ISS	A	B	1	2
E.C.O	-	-	-	1157
DATE	-	24.7.80	1/8/80	22.9.80
CHKD	-	MJD		MJD

DATE 2.6.80
DRAWN
CHECKED MJD
APPROVED
DATE 3.6.80.

datron ELECTRONICS LTD
TITLE 1065 FRONT P.C.B. ASSY
DRAWING NUMBER 400417
SHEET 2 OF 6

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
C5	101103	0.01μF. 250v CER DISC	ERIE	801	—
C6	150016	1.0 μF 20% 35V DIP TANT	UNION CARBIDE	KIR0E35	—
C7	101103	0.01μF 250V CER DISC	ERIE	801	—
C8	150002	10μF 20% 16V. D.P. TANT	UNION CARBIDE	K10E16	—
C9	104023	2n2F 20% 1KV CER DISC	ITT	HD16K102N2MS-SSIK0DSC	1
D1	200006	1A 600v GP. SIL. DIODE	FAIRCHILD	IN4005	2
D2	200006	" " " " "	"	"	—
Q1	240001	Si NPN	NATIONAL	BC184K	7
Q2	240001	" "	"	"	—
Q3	240001	" "	"	"	—
Q4	240001	" "	"	"	—
Q5	240001	" "	"	"	—
Q6	240001	" "	"	"	—
Q7	240001	" "	"	"	—
M1	290042	G.P. HIGH CURRENT. TRANS ARRAY	R.C.A.	CA3081P	2
M2	280011	DUAL D FLIP-FLOP	MOTOROLA	MC14013 BCP	1
M3	290042	G.P. HIGH CURRENT TRANS ARRAY	R.C.A	CA3081P	—
M4	280015	QUAD LATCH	MOTOROLA	MC14076	6

NOTES.

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DRAWING NUMBER 400417
SHEET 3 OF 6

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M5	280015	QUAD LATCH	MOTOROLA	MC14076	—
M6	280015	" "	"	"	—
M7	280067	16 WAY. KEYBOARD ENCODER	NATIONAL	MM74C922	2
M8	280015	QUAD LATCH	MOTOROLA	MC14076	—
M9	280015	QUAD LATCH	"	"	—
M10	280067	16 WAY. KEYBOARD ENCODER.	NATIONAL	MM74C922	—
M11	280015	QUAD LATCH	MOTOROLA	MC14076	—
					—
S1		NOT USED			—
S2		NOT USED			—
S3	700061	KEYBOARD SWITCH. RED. LED	SCHADOW	SRL - RED LED	18
S4	700061	" " " "	"	" " "	—
S5		NOT USED			—
S6	700061	" " " "	"	" " "	—
S7	700061	" " " "	"	" " "	—
S8	700061	" " " "	"	" " "	—
S9	700061	" " " "	"	" " "	—
S10		NOT USED			—

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SHEET 4 OF 6

J.W. 1364

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
S11	700061	KEYBOARD. SWITCH. RED. LED.	SCHADOW	SRL - RED LED	—
S12	700061	" " " "	"	" " "	—
S13	700061	" " " "	"	" " "	—
S14	700061	" " " "	"	" " "	—
S15	700061	" " " "	"	" " "	—
S16	700061	" " " "	"	" " "	—
S17	700061	" " " "	"	" " "	—
S18	700061	" " " "	"	" " "	—
S19	700061	" " " "	"	" " "	—
S20	700061	" " " "	"	" " "	—
S21	700061	" " " "	"	" " "	—
S22	700061	" " " "	"	" " "	—

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SHEET 5 OF 6

J.W. 1364

DESCRIPTION	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
	590001	SLEEVE. MAX CABLE Ø 3·0	HELLERMANN ELECTRIC	H15 X 20mm BLK. HELSYN	2
	410090-A8	PRINTED CIRCUIT BOARD			1
	450179-1	TERMINAL PLATE.			1
	605060	I.C. SOCKET 14 WAY	AUGAT	314-AG-39D	1
	605061	I.C. SOCKET 16 WAY	AUGAT	316-AG-39D	8
	605062	I.C. SOCKET 18 WAY	AUGAT	318-AG-39D	2
	540002	22 SWG TIN Cu WIRE			A/R
	630024	INSULATING BEADS			8
	800017	3½ DIGIT DISPLAY	DALE		1
	920015	Low. E.M.F. TERM. BLK/BLK	CLIFF	TP1 - SPECIAL	1
	920041	" " " BLK/RED	CLIFF	" "	1
	611006	SCREW M3 x 10mm STEEL POZIPAN	ZINC PLATED GKN		1
	920043	NOT Low E.M.F. TERM BLK/BRN	CLIFF	TP1	1
	920044	" " " BLK/BLUE	"	"	1
	613007	WASHER M3 FLAT STEEL	ZINC PLATED GKN		2
	630029	DOUBLE SIDED PRESSURE SENSITIVE TAPE	3M	TYPE 4032	4 x 25 mm
	420080-1	WARNING LABEL			1
	590004	SLEEVE - PTFE	HELLERMANN	FE10	45mm
	613009	SOLDER TAG 48A TINNED BRASS	R.S.		2
	590032	HEATSHRINK Ø 4·8 YELLOW			A/R
	615002	NUT M3 FULL HEX. STEEL	ZINC PLATED GKN		2
	630036	INSULATING BEAD	PARK ROYAL PORCELAIN Co	TYPE No 1 (18SWG)	2

NOTES.

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
R1	000104	100K 5% ¼W CARBON	MULLARD	CR25	10
R2	000101	100R " " "	"	"	4
R3	000101	100R " " "	"	"	-
R4	000106	10 M 10% " "	"	"	3
R5	000183	18 K " " "	MULLARD	CR25	2
R6	011302	13KO 1% 50ppm MF	HOLCO	HBC	2
R7	011302	13KO " " "	"	"	-
R8	000101	100R 5% ¼W CARBON	MULLARD	CR25	-
R9		NOT USED			-
R10	000101	100R 5% ¼W CARBON	"	"	-
R11		FSV		CR25	-
R12	000562	5K6 " " "	"	"	6
R13		NOT USED			-
R14	000562	5K6 " " "	"	"	-
R15		FSV		CR25	-
R16	050038	6K34 1% 15ppm MF	ACI	EE-0·100-C4	2
R17	050037	4K75 1% 15ppm MF	ACI	EE-0·100-C4	2
R18		PART OF KIT WITH D59			-
R19		PART OF KIT WITH D60			-
R20	063203	20K POT CERMET	BECKMAN	72P	1
R21	000104	100K 5% ¼W CARBON	MULLARD	CR25	-
R22	000102	1K " " "	"	"	4
R23	063205	2M POT CERMET	BECKMAN	72P	1

NOTES CIRCUIT DIAGRAM = 460421
CHECK PROCEDURE = 460421
CHECK LIST = 470421
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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
R24	000684	680K 5% ¼W CARBON	MULLARD	CR25	1
R25	000122	1K2 5% ¼W CARBON	MULLARD	CR25	1
R26	000225	2M2 10% ¼W CARBON	"	"	1
R27	000824	820K 5% ¼W CARBON	"	"	2
R28	000222	2K2 5% ¼W CARBON	"	"	6
R29	000100	10R " " "	"	"	8
R30	000100	10R " " "	"	"	-
R31	000473	47K " " "	"	"	3
R32	000393	39K " " "	"	"	1
R33	000473	47K " " "	"	"	-
R34	000102	1K " " "	"	"	-
R35		NOT USED			-
R36		NOT USED			-
R37	000562	5K6 5% ¼W CARBON	MULLARD	CR25	-
R38	050034	825R 1% 15ppm MF	ACI	EE0·100 C4	2
R39	050035	40R2 1% 15ppm MF	"	EE0·100 C4	2
R40	050035	40R2 1% 5ppm	"	"	-
R41		FSV.			
R42	050031	196R 1% 15ppm MF	ACI	EE 0·100 C4	2
R43	019768	97R6 1% 50ppm MF	HOLCO	HBC	2
R44		NOT USED			-
R45		NOT USED			-
R46	000182	1K8 5% ¼W CARBON	MULLARD	CR25	1

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R47	000100	10R 5% 1/4W CARBON	MULLARD	CR25	–
R48	000562	5K6 " " "	"	"	–
R49	000102	10K " " "	"		10
R50	000103	10K " " "			–
R51	000100	10R " " "	"		–
R52		NOT USED			–
R53		NOT USED			–
R54		NOT USED			–
R55		NOT USED			–
R56	000104	100K 5% 1/4W CARBON	MULLARD	CR25	–
R57	000201	200R " " "			1
R58	000821	820R " " "			1
R59	000563	56K " "			6
R60	000222	2K2 " "			–
R61	000105	1MO 10% 1/4W CARBON			10
R62	000105	1MO " " "			–
R63	000221	220R 5% 1/4W CARBON			2
R64		NOT USED			–
R65	000102	1K 5% 1/4W CARBON	"		–
R66	000103	10K " " "			–
R67	000562	5K6 " " "			–
R68	018060	806R 1% 50ppm MF	HOLCO	H8	2
R69	000114	110K 5% 1/4W CARBON	MULLARD	CR25	12

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R70	018060	806R 1% 50 ppm MF	HOLCO	H8	–
R71	070115	12K0 1% 10ppm WW	MANN	MX125	2
R72		NOT USED			–
R73	000103	10K 5% 1/4W CARBON	MULLARD	CR25	–
R74	000275	2M7 " " "			1
R75	000565	5M6 " " "	"		1
R76	000106	10M 10% 1/4W CARBON	"		–
R77	000226	22M " " "	ALLEN BRADLEY	CB2261	1
R78	000473	47K 5% 1/4W CARBON	MULLARD	CR25	–
R79	000392	3K9 " " "	"		2
R80	000104	100K "			–
R81	000472	4K7 " " "			8
R82	000472	4K7 " " "			–
R83	000472	4K7 " " "			–
R84		NOT USED			–
R85		NOT USED			–
R86	000472	4K7 5% 1/4W CARBON	MULLARD	CR25	–
R87	000114	110K " " "	"	"	–
R88		FSV			–
R89	050031	196R 1% ppm MF	ACI	EE 0·100-C4	–
R90	019768	97R6 1% 50ppm MF	HOLCO	H8C	–
R91		NOT USED			–
R92		NOT USED			–

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R93	000124	120K 5% 1/4W CARBON	MULLARD	CR25	1
R94	000102	1K " " "	"	"	–
R95	000106	10M 10% " "	"	"	–
R96	011473	147K 1% 50ppm MF	HOLCO	H8	1
R97		NOT USED			–
R98		NOT USED			–
R99	000472	4K7 5% 1/4W CARBON	MULLARD	CR25	–
R100	000472	4K7 " " "	"	"	–
R101	000100	10R 5% 1/4W CARBON	MULLARD	CR25	–
R102	000100	10R " " "	"	"	–
R103	000271	270R " " "	"	"	3
R104	000151	150R " " "	"	"	2
R105	000151	150R " " "	"	"	–
R106	000222	2k2 " " "	"	"	–
R107	000222	2k2 " " "	"	"	–
R108		NOT USED			–
R109	090068	21k622 ATTEN SET	MANN		1SET
R110	090068	9k ATTEN SET	"		–
R111	090068	1k "	"		–
R112	000682	6K8 5% 1/4W CARBON	MULLARD	CR25	1
R113	000105	1MO 10% 1/4W CARBON	"	"	–
R114	042214	2M211% 100ppm CERMET FILM	ALLEN BRADLEY	TYPE CC	1
R115	041004	1M 1% 100ppm CERMET FILM	"	"	1

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
R116	000105	1M 5% 1/4W CARBON	MULLARD	CR25	–
R117	000105	1M " " "	"	"	–
R118	000105	1M " "	"	"	–
R119	008012	27K 2W CARBON FILM	PIHER	"	2
R120	008012	27K " " "	"	"	–
R121	008011	22K " " "	"	"	2
R122	008011	22K " " "	"	"	–
R123	000304	300K 5% 1/4W CARBON	MULLARD	CR25	1
R124		NOT USED			–
R125		NOT USED			–
R126	014751	4k75 1% 50 ppm MF	HOLCO	H8	1
R127	042215	22M1 1% 100 ppm CF	ALLEN BRADLEY	CC	3
R128	042215	22M1 1% 100 ppm CF	ALLEN-BRADLEY	CC	–
R129	042215	22M1 " 100 ppm	"	"	–
R130	000362	3K6 5% 1/4W CARBON	MULLARD	CR25	2
R131	000362	3K6 " "	"	"	–
R132	000105	1M " "	"	"	–
R133	000105	1M " "	"	"	–
R134		NOT USED			–
R135	011503	150k 1% 50ppm MF	HOLCO	H8	1
R136		NOT USED			–
R137		NOT USED			–
R138		NOT USED			–

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R139		NOT USED			—
R140	090049	18M MATCHED PAIR	HOLCO		1 PAIR
R141	090049	18M " "	"		
R142	000272	2K7 5% 1/4W CARBON	MULLARD	CR25	1
R143		NOT USED			—
R144	000100	10R 5% 1/4W CARBON	MULLARD	CR25	—
R145	000100	10R " " "	"	"	—
R146	000222	2K2 " " "	"	"	—
R147	000752	7K5 " " "	"	"	1
R148		NOT USED			—
R149		NOT USED			—
R150	063104	100K POT CERMET	BECKMAN	72P	1
R151		NOT USED			—
R152		FSV	HOLCO	H8C	—
R153	011822	18K2 1% 1/8W MF	HOLCO	H8	1
R154	000103	10K 5% 1/4W CARBON	MULLARD	CR25	—
R155	000221	220R " " "	"	"	—
R156		NOT USED			—
R157	000103	10K 5% 1/4W CARBON	MULLARD	CR25	—
R158	000332	3K3 " " "	"	"	1
R159	063103	10K POT CERMET	BECKMAN	72P	1
R160	063504	500K " "	"	"	1
R161	000104	100K 5% 1/4W CARBON	MULLARD	CR25	—

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R162	000392	3K9 5% 1/4W CARBON	MULLARD	CR25	—
R163	000107	100M 10% 1/4W CARBON	ALLEN BRADLEY	CB 071	2
R164	000104	100k 5% 1/4W CARBON	MULLARD	CR25	—
R165	000104	100k			—
R166	000563	56K 5%			—
R167	000562	5K6			—
R168	000563	56K			—
R169	000563	56K			—
R170	000564	560K			2
R171	000564	560K			—
R172	000335	3M3 10% 1/4W CARBON	MULLARD	CR25	1
R173	000680	68R 5%			2
R174	000152	1K5			2
R175	000822	8K2			2
R176	000680	68R			—
R177	000152	1K5			—
R178	000822	8K2			—
R179	440067	PART OF KIT	DATRON.		1
R180	440067	" " "	"		—
R181	440067	" " "	"		—
R182	000472	4K7 5% 1/4W CARBON	MULLARD	CR25	—
R183	000472	4K7 5%	"	"	—
R184	000270	27R			2

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R185	000270	27R 5% ¼W CARBON	MULLARD	CR25	–
R186	000104	100K " " "	"		–
R187	000222	2K2 " " "			–
R188	000103	10K " " "			–
R189	000103	10K " " "	"		–
R190	000561	560R " " "			2
R191	000561	560R " " "			–
R192	000155	1M5 " " "			1
R193	000104	100K " " "			–
R194	011213	121K 1% ⅛W M.F	HOLCO	H8	1
R195	015112	511K " " "	"	"	1
R196		NOT USED			–
R197		NOT USED			–
R198		NOT USED			–
R199	008007	10R 5% 0·2W CARBON	MULLARD	CR16	2
R200	008007	10R			–
R201	000824	820K 5% ¼W CARBON	MULLARD	CR25	–
R202	000103	10K			–
R203	000104	100K			–
R204	000105	1M			–
R205	000105	1M			–
R206	000563	56K			–
R207	000103	10K			–

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A.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R208	000333	33K 5% ¼W CARBON	MULLARD	CR25	1
R209	000563	56K " " "	"	"	–
R210	000103	10K " " "	"	"	–
R211	050038	6K34 1% 15 ppm MF	ACI	EE-0·100 C4	–
R212	050034	825R 1% 15ppm MF	ACI	EE-0·100 C4	–
R213	050037	4K75 1% 15ppm MF	ACI	EE-0·100 C4	–
R214	070115	12KO 1% 10ppm WW	MANN	MX125	–
R215	000271	270R 5% ¼W CARBON	MULLARD	CR25	–
R216	000271	270R 5% ¼W CARBON	MULLARD	CR25	–
R217		NOT USED			–
R218		NOT USED			–
R219	000224	220K 5% ¼W CARBON	MULLARD	CR25	4
R220	000224	220K " " "	"	"	–
R221	000224	220K " " "	"	"	–
R222	000224	220K " " "	"	"	–
R223		NOT USED			–
R224		NOT USED			–
R225		NOT USED			–
R226		NOT USED			–
R227	000471	470R 5% ¼W CARBON	MULLARD	CR25.	1
R228	043924	3M92 1% 100ppm CF	ALLEN BRADLEY	CC	1
R229	000107	100M 10% ¼W CARBON	ALLEN BRADLEY	CB1071	–
R230	012003	200k 1% ⅛W MF	HOLCO	H8	1

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
AN1	090050	3K3 SIP NETWORK	BECKMAN	764-1-R3-3K	1
AN2	090042	R-2R LADDER NETWORK	ERIE		1
AN3	090069	9M9/100K NETWORK	CADDOCK		1
C1	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	KIOE 25	12
C2	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	KIOE 25	—
C3	104017	0·5pF 500V CER DISC	ERIE	831	1

NOTES

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TITLE 1065 ANALOGUE PCB ASSY.

DRAWING NUMBER 400421

SHEET 12 OF 24

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
C4	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	KIOE25	—
C5	102471	470pF 500V CER DISC	ERIE	801	3
C6	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	KIOE25	—
C7	150020	10µF " " " "			—
C8	102150	15pF 500V CER DISC	ERIE	801	1
C9	140016	0·47µF 400V POLYPROP	RIFA	PHE 412 HFK	1
C10	110015	0·015µF63V POLYESTER	WIMA	FKS2	1
C11	120026	680pF 20% 100v POLYCARB	WIMA	FKC2 MIN	1
C12	110011	0·47µF 100V POLYESTER	"	MKS	1
C13	102101	100pF 500V CER DISC	ERIE	801	3
C14	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	KIOE25	—
C15	150020	10µF " " " "			—
C16	102101	100pF 500V CER DISC	ERIE	801	—
C17	102100	10pF 500V CER DISC	ERIE	801	1
C18	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	KIOE25	—
C19	150020	10µF " " " "			—
C20	102470	47pF 500V CER DISC	ERIE	801	5
C21	102470	47pF 500V CER DISC	ERIE	801	—
C22	102101	100pF 500V CER DISC			—
C23	101103	0·01µF 250V CER DISC			5
C24	101103	0·01µF 250V CER DISC			—
C25	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	KIOE25	—
C26	102471	470pF 500V CER DISC	ERIE	801	—

NOTES.

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TITLE 1065 ANALOGUE PCB ASSEMBLY.

DRAWING NUMBER 400421

SHEET 13 OF 24

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C27		NOT USED			–
C28	102470	47pF 500V " "	ERIE	801	–
C29	102470	47pF 500V " "	"	"	–
C30		NOT USED			–
C31	130073	1nF 5% 160V POLYSTYRENE	SUFLEX	HSC1000/5-10/160	1
C32	101103	0·01μF 250V CER DISC	ERIE	801	–
C33	110013	0·1μF 10% 250V POLYESTER	MULLARD	C280AE/P100K	2
C34	101103	0·01μF 250V CER DISC	ERIE	801	–
C35	120016	2n2F 20% 100V POLYCARB	WIMA	FKC 2MIN.	1
C36	102471	470pF 500V CER DISC			–
C37	110013	0·1μF 10% 250V POLYESTER	MULLARD	C280AE/P100K	–
C38	102470	47pF 500V CER DISC	ERIE	801	–
C39	440067	PART OF KIT	DATRON.		–
C40	440067	" " "	"		–
C41	440067	" " "	"		–
C42		NOT USED			–
C43	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	–
C44	150020	10μF			–
C45	180006	47μF 25V AL ELECT	MULLARD	016-16479	2
C46	180006	47μF 25V			–
C47	180022	33μF 40V		016-17339	2
C48	180022	33μF 40V			–
C49	180024	10μF 63V AL ELECT	MULLARD	016-18109	2

NOTES

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TITLE: 1065 ANALOGUE PCB ASSEMBLY

DRAWING NUMBER 400421 | SHEET 14 OF 24

W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C50	180024	10μF 63V AL. ELECT	MULLARD	016-18109	–
C51	101103	0·01μF 250V CER DISC	ERIE	801	–
C52	110017	0·022μF 10% 250V POLYESTER	MULLARD	C280AE/P22K	1
C53	102332	3n3F 500V CER DISC	ERIE	801	2
C54	102332	3n3F " " "	"	"	–
C55	440067	PART OF KIT.	DATRON.		–
C56		NOT USED			–
C57	130013	18pF ±1pF 160V POLYSTYRENE	SUFLEX	HS	1
C58	110027	3300pF 20% 100V POLYESTER	WIMA	FKS2-MIN	1
C59		NOT USED			–
C60	102222	2n2F 500V CER DISC	ERIE	801	1
C61	102221	220pF 500V CER DISC	ERIE	801	1
D1	200008	Si LOW LEAKAGE	FAIRCHILD	IN458A	23
D2	210056	C5V6 400mW ZENER	MULLARD	BZY88C	2
D3	200008	Si LOW LEAKAGE	FAIRCHILD	IN458A	–
D4	210056	C5V6 400mW ZENER	MULLARD	BZY88C	–
D5	200001	Si GEN. PURPOSE	FAIRCHILD	IN4148	13
D6	200008	Si LOW LEAKAGE	FAIRCHILD	IN458A	–

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TITLE: 1065 ANALOGUE PCB ASSEMBLY

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
D7	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D8	210082	C6V2 400mW ZENER	MULLARD	BZY88C	1
D9	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D10	200008	" " "	"	"	–
D11	200008	" " "	"	"	–
D12		NOT USED			–
D13		NOT USED			–
D14		NOT USED			–
D15		NOT USED			–
D16	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D17	200008	" " "	"	"	–
D18	210068	C6V8 400mW ZENER	MULLARD	BZY88C	2
D19	210068	" " "	"	"	–
D20		NOT USED			–
D21	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D22	210220	C22V 400mW ZENER	MULLARD	BZY88C	2
D23	210220	" " "	"	"	–
D24	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D25	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D26	200008	" " "	"	"	–
D27	200008	" " "	"	"	–
D28	200008	" " "	"	"	–
D29	200008	" " "	"	"	–

NOTES

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DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D53	200008	Si LOW LEAKAGE	FAIRCHILD	IN458A.	–
D54	200008	" " "	"	"	–
D55		NOT USED			–
D56	200001	Si. Gen. PURPOSE	FAIRCHILD	IN4148	–
D57		NOT USED			–
D58		NOT USED			–
D59	219011	214010 SELECTED WITH R18			2
D60	219011	214010 SELECTED WITH R19			–
D61	210033	C3V3 400mW ZENER	MULLARD	BZY88C3V3	2
D62	210033	" " " "	"	"	–
D63	200001	Si GEN PURPOSE	FAIRCHILD	IN4148	–
D64	210120	12V 400mW ZENER	MULLARD	BZY88C12	2
D65	210120	12V 400mW ZENER	MULLARD	BZY88C12	–
D66	200008	Si LOW LEAKAGE	FAIRCHILD	IN458A	–
D67	200008	" " "	"	"	–
D68	200008	" " "	"	"	–

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SHEET 18 OF 24

DESIGNATOR	DATRON PART No	DESCRIPTION	MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
Q1	230001	N CHAN CURRENT LIM	SILICONIX	E506	2
Q2		NOT USED			–
Q3		NOT USED			–
Q4	230001	N CHAN CURRENT LIM	SILICONIX	E506	–
Q5	230027	LOW LEAKAGE N-FET	TELEDYNE	U3114	7
Q6	230027	" " "	"	"	–
Q7	230027	" " "	"	"	–
Q8	230027	" " "	"	"	–
Q9	230027	" " "	"	"	–
Q10	230027	" " "	"	"	–
Q11	230027	" " "	"	"	–
Q12	240017	LOW DRIFT DUAL NPN TRANS	NATIONAL	LM394	1
Q13	230002	N-CHAN J FET	TELEDYNE	U1994E	6
Q14	230002	" "	"	"	–
Q15	230002	" "	"	"	–
Q16	230002	" "	"	"	–
Q17		NOT USED			
Q18	230002	N-CHAN J-FET	TELEDYNE	U1994E	–
Q19	230002	" "	"	"	–
Q20	240006	Si NPN	FAIRCHILD	2N3904	5
Q21	240006	"	"	"	–
Q22	240006	"	"	"	–
Q23	240006	"	"	"	–

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Q24	240014	Si NPN	FAIRCHILD	BC337	2
Q25	250011	Si PNP	"	BC327	2
Q26	250011	" "	"	"	–
Q27	250001	Si PNP	"	BC214	1
Q28	240014	Si NPN	"	BC337	–
Q29	240001	Si NPN	"	BC184	3
Q30	240006	Si NPN	"	2N3904	–
Q31	250004	Si PNP	"	2N3906	1
Q32	240001	Si NPN	"	BC184	–
Q33	240001	Si NPN	"	BC184	–
Q34		NOT USED			–
Q35	230031	N-CHAN DUAL JFET	TELEDYNE	SU2656M	2
Q36	230031	N-CHAN DUAL JFET	TELEDYNE	SU2656M	–

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SHEET 20 OF 24

JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
M1	220018	Hi SPEED OPTO COUPLER	HEWLETT PACKARD	HP4351	4
M2		NOT USED			–
M3		NOT USED			–
M4	220018	Hi SPEED OPTO COUPLER	HEWLETT PACKARD	HP435	–
M5	220018	" "			–
M6	220018	" "			–
M7	220023	50 CTR DUAL OPTO ISOLATOR	FAIRCHILD	FCD880/50CTR	1
M8	220017	DUAL OPTO ISOLATOR	"	FCD880	5
M9	220017	" "		"	–
M10	220017	" "		"	–
M11	220017	" "	"	"	–
M12	280075	DUAL 4 I/P NAND	MOTOROLA	MC14012 BCP	1
M13	280015	QUAD LATCH	MOTOROLA	MC14076 BCP	4
M14	280015	" "	"	"	–
M15	260029	VOLTAGE COMPARATOR	NATIONAL	LM311HC	1
M16	280082	HEX INVERTER	FAIRCHILD	F40014 BPC	1
M17	280079	QUAD 2 I/P OR GATE	MOTOROLA	MC14071 BCP	1
M18	280008	QUAD 2 I/P NAND GATE	"	MC14011 BCP	2
M19		NOT USED			–
M20	280015	QUAD LATCH	MOTOROLA	MC14076 BCP	–
M21	280015	" "	"	"	–
M22	260035	5534 OP AMP	SIGNETICS	NE5534T	1
M23		NOT USED			–

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SHEET 21 OF 24

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M24	220017	DUAL OPTO ISOLATOR	FAIRCHILD	FCD880	–
M25	260022	LINEAR IC OP AMP	NATIONAL	LF 355	2
M26	280022	QUAD BILATERAL SWITCH	MOTOROLA	MC14016 BCP	1
M27	280008	QUAD 2 I/P NAND GATE	"	MC14011 BCP	–
M28	280044	BINARY UP/DOWN COUNTER	"	MC14516 BCP	1
M29	280011	DUAL D FLIP-FLOP	"	MC14013 BCP	1
M30		NOT USED			–
M31	260022	LINEAR I.C. OP. AMP	NATIONAL	LF 355	–
M32	260026	" " " "	"	LM212H	1
M33	260002	" " " "	FAIRCHILD	741 HC	1
M34	260013	" " " "	NATIONAL	LF 356 H	1
M35 *	280076	8 I/P MULTIPLEXER	MOTOROLA	M14051 BCL	1
M36	290047	212 OP AMP SELECTED	DATRON	LM212H (GREEN/WHITE)	1
M37		NOT USED			–
M38		NOT USED			–
M39	260028	DUAL LINEAR IC	FAIRCHILD	μA1458CTC	1

NOTES * ALTERNATIVE 290082 MC14051 BCL (GREEN)

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
RL1	330003	RELAY 2P2W CROSS BAR	P&B	RIO-E1-L2-Q5-BK-(25207)	1
RL2	330009	D.I.L RELAY FORM 1A	ERG		1
	400379/1	WIRE / TERMINAL ASSY			7
	400379/2	" " "			4
	410095-5A	P.C.B.			1
	459112	RELAY BRACKET	KDP		1
	540002	22 SWG TINNED COPPER WIRE			A/R
	540008	7/0.2 PTFE INSUL WHITE WIRE			170 mm
	590001	SLEEVE MAX CABLE Ø 3.0	HELLERMANN ELECTRIC	H15 x 20 mm BLK HELSYN	5
	590004	SLEEVE - PTFE	—"— —"—	FE10	A/R
	602001	F.S.V. TERMINAL	MOLEX		
J3,4,5	605002	16 WAY DIL SOCKET	JERMYN	02-04-1875	6
	605037	14 WAY DIL SOCKET	ASTRALUX	A23-2001/Y	3
	605038	16 WAY DIL SOCKET	ASTRALUX	ICL143-S3T	7
J1&J6	605052	8 WAY POLARISED SOCKET	MOLEX	ICL143-S6T	10
	605059	8 WAY DIL SOCKET	ASTRALUX	22-01-2085	2
	606005	CLIP FOR 605002	ANTIFERENCE	ICL-083-SGT	3
				RC-74	3

NOTES.

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
	611004	SCREW M3 x 6mm POZI PAN	GKN	ZINC PLATED	1
	613005	WASHER M3 INT/SHAKE PROOF ST	GKN	" "	1
	615002	NUT M3 FULL HEX STEEL		" "	1
	617010	NYLATCH PLUNGER HN3P	RICHCO	HN3P-32-4-1	7
	617011	" GROMMET HN3G	"	HN3G-32-1	7
	620005	CLOVERLEAF P.T.F.E. TERM.	SEALECTRO	FTE 15 P20	8
	620001	CLOVERLEAF P.T.F.E. TERM	SEALECTRO	FTE12 P20	2
	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	4
	630036	STANDARD STEATITE INSUL BEAD	PARK ROYAL PORCELAIN CO	TYPE N°1 (18 SWG)	6
	615005	NUT 3-48 UNC FULL HEX ST'L.			1
	613014	WASHER M2·5 INT/SHAKEPROOF ST.	GKN DISTRIBUTORS.	ZINC PLATED	1
	900004	SILICONE RUBBER COMPOUND	R.S. COMPONENTS	554-119	A/R

NOTES

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SHEET 24 OF 24

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	000103	10k 5% ¼W CARBON	MULLARD	CR25	81
R2	000103	10k " " "	"	"	—
R3	000103	10k " " "	"	"	—
R4	000103	10k " " "	"	"	—
R5	000103	10k " " "	"	"	—
R6	000102	1k " " "	"	"	—
R7	000103	10k " " "	"	"	10
R8	000472	4k7 " " "	"	"	—
R9	000102	1k " " "	"	"	8
R10	000684	680k " " "	"	"	—
R11	063204	200k POT CERMET	BECKMAN	72P	3
R12	000103	10k 5% ¼W CARBON	MULLARD	CR25	1
R13	000102	1k " " "	"	"	—
R14		NOT USED			—
R15	000472	4k7 5% ¼W CARBON	"	"	—
R16	000332	3k3 " " "	"	"	3
R17	000683	68k " " "	"	"	2
R18	000222	2k2 " " "	"	"	7
R19	000393	39k " " "	"	"	1
R20	000104	100k			15
R21	000104	100k			—
R22	000104	100k " " "	"	"	—
R23	000102	1k " " "	"	"	—

NOTES. CIRCUIT DIAGRAM = 430422
CHECK PROCEDURE = 460422
CHECK LIST = 470422
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SHEET 2 OF 16

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
R24	000102	1k 5% ¼W CARBON	MULLARD	CR25	—
R25	000332	3k3 " " "	"	"	—
R26	000103	10k " " "	"	"	—
R27	000102	1k " " "	"	"	—
R28	000682	6k8 " " "	"	"	1
R29	000104	100k " " "	"	"	—
R30		NOT USED			—
R31	000472	4k7 " " "	"	"	—
R32	000472	4k7 " " "	"	"	—
R33	000222	2k2 " " "	"	"	—
R34	000104	100k " " "	"	"	—
R35	000104	100k " " "	"	"	—
R36	000104	100k " " "	"	"	—
R37	000106	10M 10% " "	"	"	—
R38	000104	100k 5% " "	"	"	1
R39	000103	10k " " "	"	"	—
R40	000103	10k " " "	"	"	—
R41	000332	3k3 " " "	"	"	—
R42	000103	10k " " "	"	"	—
R43	000104	100k " " "	"	"	—
R44	000103	10k " " "	"	"	—
R45	000334	330k " " "	"	"	—
R46	000472	4k7 " " "	"	"	2

NOTES.

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R47	000103	10k 5% ¼W CARBON	MULLARD	CR25	—
R48	000104	100k " " "	"	"	—
R49	000103	10k " " "	"	"	—
R50	000104	100k " " "	"	"	—
R51	000562	5k6 " " "	"	"	1
R52	000224	220k " " "	"	"	1
R53	000123	12k " " "	"	"	1
R54	000105	1M " " "	"	"	1
R55	000684	680k " " "	"	"	—
R56	000104	100k " " "	"	"	—
R57		NOT USED			—
R58	000100	10R " " "	"	"	2
R59	000220	22R " " "	"	"	2
R60	000220	22R " " "	"	"	—
R61	000100	10R " " "	"	"	—
R62		NOT USED			—
R63	000222	2k2 5% ¼W CARBON	MULLARD	CR25	—
R64	000222	2k2 " " "	"	"	—
R65	000103	10k " " "	"	"	—
R66	000103	10k " " "	"	"	—
R67	000271	270R " " "	"	"	1
R68	000103	10k " " "	"	"	—
R69	000561	560R " " "	"	"	1

NOTES

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TITLE 1065 DIGITAL PCB. ASSY

DRAWING NUMBER 400422

SHEET 4 OF 16

JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
R70	000222	2k2 5% ¼W CARBON	MULLARD	CR25	—
R71	000102	1k " " "	"	"	—
R72	000221	220R " " "	"	"	1
R73	000102	1k " " "	"	"	—
R74	000124	120k " " "	"	"	1
R75	000471	470R " " "	"	"	1
R76	000824	820k " " "	"	"	1
R77		NOT USED			—
R78		NOT USED			—
R79	000472	4k7 " " "	"	"	—
R80	000683	68k " " "	"	"	—
R81	000183	18k " " "	"	"	1
R82	000334	330k " " "	"	"	—
R83	063202	2K POT CERMET	BECKMAN	72 P	1
R84	000223	22k 5% ¼W CARBON	MULLARD	CR25	1
R85	000472	4k7 " " "	"	"	—
R86		NOT USED			—
R87	000104	100k			—
R88	000103	10k " " "	"	"	—
R89	000103	10k " " "	"	"	—
R90		NOT USED			—
R91	012002	20kΩ 1% ⅛W 50ppm MF	HOLCO	HQC	1
R92	015231	5k23 " " "	"	"	1

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SHEET 5 OF 16

JW. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R93		NOT USED			—
R94	000102	1k 5% ¼W CARBON	MULLARD	CR25	—
R95	000472	4k7 " " "	"	"	—
R96	000103	10k " " "	"	"	—
R97	000222	2k2 " " "	"	"	—
R98		NOT USED			—
R99	000104	100k 5% ¼W CARBON	"	"	—
R100	000104	100k " "	"	"	—
R101	000684	680k " "	"	"	—
R102	000103	10k " " "	"	"	—
R103	000222	2k2 " "	"	"	—
R104	000102	1k " "	"	"	—
AN1	090046	10k x 7 2% NETWORK	BECKMAN	764-1-R10k	5
AN2		NOT USED			—
AN3	090046	10k x 7 2% NETWORK	BECKMAN	764-1-R10k	—
AN4	090042	8 BIT 'R-2R' LADDER NETWORK	SEE DRG		1
AN5	090046	10k x 7 2% NETWORK	BECKMAN	764-1-R10k	—
AN6	090046	10k x 7 2% NETWORK	BECKMAN	764-1-R10k	—
AN7	090046	10k x 7 2% NETWORK	BECKMAN	764-1-R10K	—

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SHEET 6 OF 16

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy.
C1	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	14
C2	150002	10µF " " " "	" "	"	—
C3	150002	10µF " " " "	" "	"	—
C4	150016	1 µF " 35v " "	" "	K1R0E35	7
C5	110013	·1 µF 10% 250v POLYESTER	MULLARD	C280AE/P100k	3
C6	101103	·01µF 250v CER DISC	ERIE	801	6
C7	150006	4·7µF 20% 16v DIP TANT	UNION CARBIDE	K4R7E16	1
C8		NOT USED			—
C9	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	—
C10	102101	100pF 500v CER DISC	ERIE	801	5
C11	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	—
C12	150016	1µF " 35v " "	" "	K1R0E35	—
C13	150002	10µF " 16v " "	" "	K10E16	—
C14	110013	0·1µF 10% 250v POLYESTER	MULLARD	C280AE/P100K	—
C15	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K1R0E16	—
C16	102221	220pF 500v CER DISC	ERIE	801	3
C17	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	—
C18	150002	10µF " " " "	" "	"	—
C19	150016	1µF " 35v " "	" "	K1R0E35	—
C20	150002	10µF " " " "	" "	K10E16	—
C21	102101	100pF 500v CER DISC	ERIE	801	—
C22	101103	·01µF 250v CER DISC	ERIE	801	—
C23	120016	2n2F 20% 100v POLYCARD	WIMA	FKC 2MIN	1

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SHEET 7 OF 16

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C24	130016	130pF 2½% 25v POLYSTYRENE	SUFLEX	HSQ130/2½-7/25	1
C25	102471	470pF 500v Cer Disc	ERIE	801	2.
C26	150016	1µF 20% 35v DIP TANT	UNION CARBIDE	K1R0E35	—
C27	150002	10µF " 16v " "	" "	K10E16	—
C28	102220	22pF 500v CER DISC	ERIE	801	3
C29	150016	1µF 20% 35V DIP TANT	UNION CARBIDE	K1R0E35	—
C30	150002	10µF 20% 16V " "	" "	K10E16	—
C31	110005	·01µF 10% 250v POLYESTER	MULLARD	C280AE/P10K	1
C32	110003	·068µF			1
C33	150014	·68µF 20% 35v DIP TANT	UNION CARBIDE	KR68E35	1
C34	101103	·01µF 250v CER DISC	ERIE	801	—
C35	150002	10µF 20% 16V DIP TANT	UNION CARBIDE	K10E16	—
C36	101103	·01µF 250v CER DISC	ERIE	801	—
C37	102220	22pF 500v CER DISC		"	—
C38	102221	220pF 500v " "	"	"	—
C39	101103	·01µF 250v " "	"	"	—
C40	110013	·1µF 10% 250v POLYESTER	MULLARD	C280AE/P100K	—
C41	110027	3n3F 20% 100V POLYESTER	WIMA	FKS2MIN	1
C42	102471	470pF 500v CER DISC	ERIE	801	—
C43	102101	100pF 500v CER DISC.	"	801	—
C44	150002	10µF 20% 16v DIP TANT.	UNION CARBIDE	K10E16	—
C45	150016	1µF 20% 35v " "	" "	K1R0E35.	—
C46	102220	22pF 500v CER DISC	ERIE	801	—

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SHEET 8 OF 16

A.W. 1364

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
C47	150004	100µF 20% 6V3 DIP TANT.	UNION CARBIDE	K100E6V3	1
C48		NOT USED			—
C49	101103	·01µF 250v CER. DISC	ITT	CD10	—
C50	102101	100pF 500v CER. DISC	ITT	801	—
C51	102101	100pF 500v CER. DISC	ITT	801	—
C52		NOT USED			—
C53	102221	220pF 500v CER. DISC	ERIE	801	—
C54	130008	68pF 5% 160v POLYSTYRENE	SUFLEX	HS	1
C55	150016	1µF 20% 35v DIP TANT	UNION CARBIDE	K10E16	—

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	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy.
D1	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	10
D2	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D3	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D4	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D5	200008	200mA 125v LL Si DIODE	FAIRCHILD	IN458A	1
D6	220010	Si HOT CARRIER DIODE	HP	HSCH1001/IN6263	1
D7	210027	2V7 400mW ZENER	MULLARD	BZY88C2V7	1
D8	210033	3V3 400mW ZENER	MULLARD	BZY88C3V3	1
D9	220022	DUAL 37pF VARICAP DIODE	THOMPSON – CSF	BB204B	2
D10	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D11	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D12	200002	1A. 50v. GP. Si. DIODE	FAIRCHILD	IN4001	2
D13	213006	5V 5W ZENER	UNITRODE	TVS505	1
D14	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D15	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D16	200002	1A. 50v. GP. Si. DIODE	FAIRCHILD	IN4001	—
D17	200001	Si GP. DIODE	FAIRCHILD	IN4148	—
D18		NOT USED			—
D19		NOT USED			—
D20	220022	DUAL 37pF VARICAP DIODE	THOMPSON – CSF	BB204B	—
D21	200001	75mA 75v GP Si. DIODE	FAIRCHILD	IN4148	—

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
Q1	240001	Si NPN TRANSISTOR	NATIONAL	BC184	5
Q2	240001	" " "	"	"	—
Q3	240007	" " "	"	2N3646	2
Q4		NOT USED			—
Q5	240006	Si NPN TRANSISTOR	NATIONAL	2N3904	2
Q6	250004	Si PNP "	"	2N3906	3
Q7	250004	" " "	"	"	—
Q8	240001	" NPN "	"	BC184	—
Q9	240001	" " "	"	"	—
Q10	250001	" PNP "	"	BC214	1
Q11					—
Q12	250011	" PNP "	"	BC327	1
Q13	240007	" NPN "	"	2N3646	—
Q14	240001	" " "	"	BC184	—
Q15	240006	" " "	"	2N3904	—
Q16	250004	" PNP "	"	2N3906	—
Q17	250008	" " "	"	BC214KC	1

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AW. 1184

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M1	280011	DUAL D FLIP-FLOP	MOTOROLA	MC14013BCP	2
M2	280022	QUAD BILATERAL SWITCH	"	MC14016BCP	1
M3	280024	TRI-STATE HEX NON-INV. BUFFER	"	MC14503BCP	7
M4	280024	" " " " " "	"	"	—
M5	280024	" " " " " "	"	"	—
M6	280024	" " " " " "	"	"	—
M7	280015	QUAD LATCH	"	MC14076BCP	5
M8	280015	" "	"	"	—
M9	280015	" "	"	"	—
M10	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503BCP	—
M11	280015	QUAD LATCH	"	MC14076BCP	—
M12	280015	" "	"	"	—
M13	280044	BINARY UP/DOWN COUNTER	"	MC14516BCP	4
M14	280044	" " " "	"	"	—
M15	290003	TIMER - ASTABLE	SIGNETICS	NE 555V	3
M16	270058	DUAL 1-of-4 DECODER	NATIONAL	74LS155	2
M17	270048	QUAD 2 I/P NAND GATE	NATIONAL	74LS00	2
M18		NOT USED			—
M19	280066	256x4 BIT STATIC CMOS RAM	SEE DRAWING		4

NOTES.

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
M20	280066	256x4 BIT STATIC CMOS RAM	SEE DRAWING		—
M21	280037	HEX BUFFER	MOTOROLA	MC14050BCP	1
M22	280011	DUAL D FLIP-FLOP	"	MC14013BCP	—
M23	270053	A-D CHIP	FERRANTI	ZNA 2035	1
M24	280024	TRI-STATE HEX NON-INV BUFFER	MOTOROLA	MC14503BCP	—
M25	280024	" " " " " "	"	"	—
M26	280006	DUAL J-K FLIP-FLOP	"	MC14027BCP	1
M27	280004	14 BIT BINARY COUNTER	"	MC14020BCP	1
M28	270051	DUAL 4 I/P AND GATE	NATIONAL	74LS21	2
M29	270055	DUAL 4 I/P NAND GATE	"	74LS20	2
M30	290086-1A	4k x 8 EPROM - SEE PROG. SPEC		TMS 2532 JL/PROGRAM'D	1
M31	280066	256x4 BIT STATIC CMOS RAM	SEE DRAWING		—
M32	270058	DUAL 1-of-4 DECODER	NATIONAL	74LS155	—
M33	270051	DUAL 4 I/P AND GATE	"	74LS21	—
M34	270055	DUAL 4 I/P NAND GATE	"	74LS20	—
M35	290085-1A	4k x 8 EPROM - SEE PROG. SPEC		TMS 2532 JL/PROGRAM'D	1
M36	280066	256x4 BIT STATIC CMOS RAM	SEE DRAWING		—
M37	280025	QUAD BILATERAL SWITCH	MOTOROLA	MC14066BCP	2
M38	280071	TRIPLE 3 I/P NOR GATE	MULLARD	HEF4025P	2
M39	280017	HEX INVERTER	MOTOROLA	MC14069BCP	1
M40	280083	QUAD 2 I/P NOR GATE	MULLARD	HEF40018P	1
M41	280044	BINARY UP/DOWN COUNTER	MOTOROLA	MC14516BCP	—
M42	280003	QUAD LATCH	"	MC14042BCP	2

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J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M43	290003	TIMER - ASTABLE	SIGNETICS	NE 555V	—
M44	270048	QUAD 2 I/P NAND GATE	NATIONAL	74LS00	—
M45	270050	HEX INVERTER .	"	74LS04	1
M46	280025	QUAD BILATERAL SWITCH	MOTOROLA	MC14066BCP	—
M47	280070	DIVIDE-BY-8 COUNTER/DIVIDER	MULLARD	HEF 4022P	1
M48	280071	TRIPLE 3 I/P NOR GATE	"	HEF 4025P	—
M49	280023	QUAD 2 I/P NOR GATE	MOTOROLA	MC14001 BCP	1
M50	280044	BINARY UP/DOWN COUNTER	"	MC14516 BCP	—
M51	280003	QUAD LATCH	"	MC14042 BCP	—
M52	270056	8 I/P NAND GATE	NATIONAL	74LS30	1
M53	280061	MICRO PROCESSOR CHIP	MOTOROLA	MC 6800L	1
M54	270023	QUAD 2 I/P NAND GATE	NATIONAL	7437	1
M55	270054	QUAD 2 I/P AND GATE	"	74LS08	2
M56	270054	" " " "	"	"	—
M57	270057	DUAL JK FLIP-FLOP	"	74LS76	1
M58	280009	HEX INVERTER/BUFFER	MOTOROLA	MC14049	2
M59	280009	HEX INVERTER/ BUFFER	MOTOROLA	MC14049	—
M60, M62	260031	VOLTAGE DETECTOR	INTERSIL	ICL8211	2
M61	290003	TIMER - ASTABLE	SIGNETICS	NE555V	—
S1		NOT USED			—
S2		NOT USED			—
S3		NOT USED			—

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W - 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
L1	370003	1000μH 40Ω R.F. CHOKE	SIGMA	SC10/1000	1
L2	370002	100μH ·4Ω R.F. CHOKE	TOKO	YXRS 18576	1
	590004	SLEEVE - PTFE	HELLERMAN ELECTRIC	FE10	A/R
TP1 - TP33, LINKS	540002	22 SWG. BTC WIRE			A/R
	920048	BUS STRIP	MEKTRON	M823 14 7.3F	1
	630098	COMPONENT CLIP	RICHCO	KKU-8	1
	606005	CLIP FOR 605002	ANTIFERENCE	RC74	3
J1, J2, J4	605002	16 WAY D.I.L. LOW PROFILE SKT.	JERMYN OR ANTIFERENCE	A23-2001/Y OR ICN-163-S3	3
	605065	28 WAY D.I.L. " " "	AUGAT	328-AG39D	1
	605037	14 WAY D.I.L. SOCKET	ASTRALUX OR JERMYN	ICL143-S3T	21
	605038	16 WAY D.I.L. SOCKET	" "	ICL163-S6T	30
	605050	40 WAY D.I.L. SOCKET	AUGAT	340-AG39D	1
	605063	22 WAY D.I.L. SOCKET	AUGAT	322-AG39D	4
J3	605064	24 WAY D.I.L. SOCKET	"	324-AG39D	3
JL3	604037	PROGRAMMING CLASS 160 PLUG	"	8136-475G8	1
	605059	8 WAY D.I.L. SOCKET	ASTRALUX	ICL-083-S6T	1
J5	605052	8 WAY POLARISED SOCKET	"	22-01-2085	1
	617010	NYLATCH PLUNGER	ORDER FROM CJ FOX & SONS	HN3P-32-4-1	8
	617011	NYLATCH GROMMET	" " " "	HN3G-32-1	8
	410096-7A	PCB			1

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
	400379/1	WIRE/TERMINAL ASSY.			8
J6		NOT USED			—
J7		NOT USED			—
	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	5

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R1		NOT USED			—
R2	000681	680R 5% ¼W CARBON	MULLARD	CR25	1
R3	000392	3K3 5% ¼W CARBON	MULLARD	CR25	3
R4	000332	3k3 5% ¼W CARBON	MULLARD	CR25	—
R5	000123	12K 5% ¼W. CARBON.	MULLARD	CR25	1
R6	000222	2K2 5% ¼W CARBON.	MULLARD	CR25	1
R7		NOT USED			
R8		NOT USED			
R9		NOT USED.			
R10		NOT USED			
R11	000183	18K 5% ¼W CARBON	MULLARD	CR25	1
R12	000105	1M 5% ¼W CARBON.	MULLARD	CR25	1
R13	000332	3k3 5% ¼W CARBON	MULLARD	CR25	—
R20	000103	10k 5% ¼W CARBON	MULLARD	CR25	1
C1	150022	2u2F 20% 35V DIP TANT	UNION CARBIDE	K2R2E35	1
C2		NOT USED			—
C3	150007	6u8F 20% 16v DIP. TANT.	UNION CARBIDE	K6R8E16	1
C4		NOT USED			—
C5	102101	100pF 10% 500v CER DISC	ITT	CD10	1

NOTES

SEE SHEET 3 FOR LATEST ISSUE

ISS	A	1	2
ECO	—	—	1149.1154
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TITLE REAR INPUT ASSY. 1065

DRAWING NUMBER 400423 SHEET 3 OF 7.

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
D1	200001	75mA. 75V GP SL DIODE	FAIRCHILD	IN4148	3
D2	200001	75mA 75V GP Si DIODE	FAIRCHILD	IN4148	—
D3	200001	75mA. 75V GP SL DIODE	FAIRCHILD	IN4148	—
D4		NOT USED			—
D5		NOT USED			—
D6		NOT USED			—
Q1	240001	SL NPN TRANSISTOR	NATIONAL	BC184/TO18	2
Q2	240001	Si NPN TRANSISTOR	NATIONAL	BC184/TO18	—
Q3	250001	SL PNP TRANSISTOR	NATIONAL	BC214/TO18	1
Q4		NOT USED.			
M1	280011	DUAL D FLIP-FLOP	MOTOROLA	MC14013 BCP	1
J1	604036	CON. PIN STRIP OF 10 HORIZ TYPE	AMP	163740-8	2
J2. J3	605092	8WAY POLARISED SOCKET	MOLEX	(22-01-2085) 6471-8-1	2

NOTES.

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JW 1184

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
J4 & J6	604033	FLAT WAFER PIN (4 WAY GOLD)	MOLEX	22-27-2041/GOLD	3
J5	605051	4 WAY POLARISED SOCKET	MOLEX	22-01-2045	1
	400379/4	WIRE/TERMINAL ASSY	HOLDEN CORDS		6
	400379/3	WIRE/TERMINAL ASSY	HOLDEN CORDS		4
RL1 (1)	330003	RELAY 2P2W CROSSBAR	P & B	R10-E1-C2-G5-BK(25207)	1
RL2 (11)	330001	RELAY 4P2W CROSSBAR	P & B	R10-E1-L4-Q2-5K	1
RL3 & RL4		NOT USED.			
	410106-4	COMPONENT P.C.B			1
	410132-3	RELAY P.C.B.			1
	450257-1	SOCKET PLATE			1
	450241-1	RELAY BRACKET			1
	540002	22SWG TINNED COPPER WIRE			A/R
	540008	7/.2 PTFE INS. WHITE WIRE			140 mm

NOTES (1) ALTERNATIVE RELAY 330015 (OMRON)
(11) ALTERNATIVE RELAY 330016 (OMRON)

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	590001	SLEEVE. MAX CABLE Ø 3.0mm	HELLERMAN ELECTRIC	HIB×20MM BLK HELSYN	17
	590004	SLEEVE — PTFE	HELLERMAN ELECTRIC	FE10	30mm.
J11	604008	7 WAY PLUG PANEL MTG	PYE CONNECTORS	M7P	1
	605009	7 WAY SOCKET	PYE CONNECTORS	M7S	1
	605057	CRIMP TERMINAL	MOLEX	4809-GL	2
	606001	LOCKING HOOD	PYE CONNECTORS	MHN	1
	606002	NUT	PYE CONNECTORS	MN	1
	606003	WASHER	PYE CONNECTORS	MLW	1
	605037	14 WAY DIL SOCKET	ASTRALUX OR JERMYN	~~HCN-146-54T~~ or A23-2023Y	1
	G11004	SCREW M3×6mm STEEL POSI-PAN	G.K.N	ZINC PLATED	7.
	G11007	SCREW M3×6mm STEEL POSI-CSK.	G.K.N	ZINC PLATED	7.
	G11016	SCREW M3×8MM STEEL POSI-PAN	G.K.N.	ZINC PLATED.	4.
	G12020	STAND-OFF NYLON M3×19 TRANS PILLAR.	W.K. ELECTRONICS.	TPI/G3/19/M3/I/I	5

NOTES.

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	613005	WASHER M3 INT SHAKE Proof ST	GKN DISTRIBUTORS	ZINC PLATED	13
	615001	NUT BBA FULL HEX STEEL		ZINC PLATED	2
	615002	NUT M3 FULL HEX STEEL		ZINC PLATED	2

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	090074	8k2 ·25% 15ppm MF	ACI	SEE DRG	1
R2	011181	1k18 1% ⅛W 50ppm MF	HOLCO	H8C	1
R3	015900	590R 1% ⅛W 50ppm MF	HOLCO	H8C	1
R4	012940	294R 1% ⅛W 50ppm MF	HOLCO	H8C	1
R5	011470	147R 1% ⅛W 50ppm MF	HOLCO	H8C	1
R6	090074	16k ·25% 15ppm MF	ACI	SEE DRG	—
R7		NOT USED			—
R8	000394	390k 5% ¼W CARBON	MULLARD	CR25	1
R9	000103	10k 5% ¼W CARBON	MULLARD	CR25	3
R10		NOT USED			—
R11		NOT USED			—
R12	000152	1k5 5% ¼W CARBON	MULLARD	CR25	2
R13	000224	220k 5% ¼W CARBON	MULLARD	CR25	1
R14	000333	33k 5% ¼W CARBON	MULLARD	CR25	3
R15	000104	100k 5% ¼W CARBON	MULLARD	CR25	3
R16	000685	6M8 5% ¼W CARBON	MULLARD	CR25	1
R17	000332	3k3 5% ¼W CARBON	MULLARD	CR25	6
R18	090071	100k ·25% 15ppm MF	ACI	SEE DRG	1
R19	090071	100k ·25% 15ppm MF	ACI	SEE DRG	—
R20		FSV (270k NOM)	MULLARD	CR25	—
R21	000821	820R 5% ¼W CARBON	MULLARD	CR25	1
R22	290026	RMS KIT	DATRON	SEE DRG	1
R23	000270	27R 5% ¼W CARBON	MULLARD	CR25	1

NOTES. * NOT USED ON ASSEMBLIES FITTED INTO 1061;

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R24	000686	68M 10% ¼W CARBON	ALLEN BRADLEY	CB10	1
R25	000221	220R 5% ¼W CARBON	MULLARD	CR25	3 5
R26	000154	150k 5% ¼W CARBON	MULLARD	CR25	1
R27	000274	270k 5% ¼W CARBON	MULLARD	CR25	1
R28	290026	RMS KIT	DATRON	SEE DRG	—
R29	000226	22M 5% ¼W CARBON	MULLARD	CR25	1
R30		NOT USED			—
R31		NOT USED			—
R32	000182	1k8 5% ¼W CARBON	MULLARD	CR25	1
R33	000333	33k 5% ¼W CARBON	MULLARD	CR25	—
R34	000103	10K 5% ¼W CARBON	MULLARD	CR25	—
R35	063500	50R POT ⅜"SQ. CERMET	BECKMAN	72P	2
R36		NOT USED			—
R37		NOT USED			—
R38	000683	68k 5% ¼W CARBON	MULLARD	CR25	1
R39		NOT USED			—
R40	000183	18k 5% ¼W CARBON	MULLARD	CR25	2
R41	000332	3k3 5% ¼W CARBON	MULLARD	CR25	—
R42	000332	3k3 5% ¼W CARBON	MULLARD	CR25	—
R43	000332	3k3 5% ¼W CARBON	MULLARD	CR25	—
R44	000331	330R 5% ¼W CARBON	MULLARD	CR25	2
R45	000680	68R 5% ¼W CARBON	MULLARD	CR25	1
R46	000472	4k7 5% ¼W CARBON	MULLARD	CR25	1

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R47	090070	4k7 ·25% 15 ppm MF	ACI	SEE DRG	1
R48	090071	18k ·25% 15 ppm MF	ACI	SEE DRG	—
R49	000912	3k1 5% 1/4W CARBON	MULLARD	CR25	1
R50	063200	50R POT 3/8"SQ. CERMET	BECKMAN	72P	—
R51	000565	5M6 5% 1/4W CARBON	MULLARD	CR25	1
R52		NOT USED			—
R53		NOT USED			—
R54		NOT USED			—
R55		NOT USED			—
R56	000103	10k 5% 1/4W CARBON	MULLARD	CR25	—
R57	000105	1M 5% 1/4W CARBON	MULLARD	CR25	4
R58		NOT USED			—
R59	000120	12R 5% 1/4W CARBON	MULLARD	CR25	2
R60	000120	12R 5% 1/4W CARBON	MULLARD	CR25	—
R61	000222	2k2 5% 1/4W CARBON	MULLARD	CR25	4
R62	000332	3k3 5% 1/4W CARBON	MULLARD	CR25	—
R63	000222	2k2 5% 1/4W CARBON	MULLARD	CR25	—
R64	000222	2k2 5% 1/4W CARBON	MULLARD	CR25	—
R65	000101	100R 5% 1/4W CARBON	MULLARD	CR25	3
R66	000221	220R 5% 1/4W CARBON	MULLARD	CR25	—
R67	000183	18k 5% 1/4W CARBON	MULLARD	CR25	—
R68	090071	18k ·25% 15 ppm MF	ACI	SEE DRG	—
R69	090070	4k7 ·25% 15 ppm MF	ACI	SEE DRG	—

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R70	000272	2K7 5% 1/4W CARBON	MULLARD	CR25	2
R71	000272	2K7 5% 1/4W CARBON	MULLARD	CR25	—
R72	000151	150R 5% 1/4W CARBON	MULLARD	CR25	1
R73	000105	1M 5% 1/4W CARBON	MULLARD	CR25	—
R74	000564	560k 5% 1/4W CARBON	MULLARD	CR25	1
R75	063504	500k POT 3/8"SQ CERMET	BECKMAN	72P	2
R76	090073	62kG ·25% 15 ppm MF	ACI	SEE DRG	1
R77	000104	100k 5% 1/4W CARBON	MULLARD	CR25	—
R78	000225	2M2 5% 1/4W CARBON	MULLARD	CR25	2
R79	000114	110k 5% 1/4W CARBON	MULLARD	CR25	1
R80	000561	560R 5% 1/4W CARBON	MULLARD	CR25	1
R81	000101	100 R 5% 1/4W CARBON	MULLARD	CR25	—
R82	000101	100R 5% 1/4W CARBON	MULLARD	CR25	—
R83		NOT USED			—
R84		NOT USED			—
R85		NOT USED			—
R86		NOT USED			—
R87		NOT USED			—
R88		NOT USED			—
R89		NOT USED			—
R90	063204	200k POT 3/8"SQ. CERMET	BECKMAN	72P	1
R91	000105	1M 5% 1/4W CARBON	MULLARD	CR25	—
R92	000105	1M 5% 1/4W CARBON	MULLARD	CR25	—

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R93	000225	2M2 5% 1/4W CARBON	MULLARD	CR25	—
R94		NOT USED			—
R95		NOT USED			—
R96		NOT USED			—
R97		NOT USED			—
R98		NOT USED			—
R99		NOT USED			—
R100		NOT USED			—
R101	000471	470R 5% 1/4W CARBON	MULLARD	CR25	2
R102	090073	62k6 ·25% 15ppm MF	ACI	SEE DRG	—
R103	000221	220R 5% 1/4W CARBON	MULLARD	CR25	—
R104	000163	16k 5% 1/4W CARBON	MULLARD	CR25	1
R105	000623	62k 5% 1/4W CARBON	MULLARD	CR25	1
R106	011001	1k00 1% 1/8W 50ppm MF	HOLCO	H8C	3
R107	011803	180k 1% 1/8W 50ppm MF	HOLCO	H8C	1
R108	042215	22M1 1% 1/2W 100ppm MF	ALLEN BRADLEY	CC	2
R109	090072	1k ·25% 15ppm MF	ACI	SEE DRG.	1
R110	090072	10k1 ·25% 15ppm MF	ACI	SEE DRG	—
R111	090072	111k ·25% 15ppm MF	ACI	SEE DRG	—
R112	063 504	500k POT 3/8" 3/8" CERMET	BECKMAN	72P	—
R113	042215	22M1 1% 1/2W 100ppm MF	ALLEN BRADLEY	CC	—
R114	090072	1M ·25% 15ppm MF	ACI	SEE DRG	—
R115	000822	8k2 5% 1/4W CARBON	MULLARD	CR25	1

NOTES.

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AMD. 1104

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
R116	000336	33M 10% 1/4W CARBON	ALLEN BRADLEY	CB10	1
R117	000102	1k 5% 1/4W CARBON	MULLARD	CR25	2
R118	000823	82k 5% 1/4W CARBON	MULLARD	CR25	1
R119	000107	100M 10% 1/4W CARBON	ALLEN BRADLEY	CB10	2
R120	000102	1k 5% 1/4W CARBON	MULLARD	CR25	—
R121	063 105	1M POT 3/8" 3/8" CERMET	BECKMAN	72 P	1
R122	000104	100k 5% 1/4W CARBON	MULLARD	CR25	—
R123	090072	277k ·25% 15ppm MF	ACI	SEE DRG	—
R124	090072	277k ·25% 15ppm MF	ACI	SEE DRG	—
R125	090072	277k ·25% 15ppm MF	ACI	SEE DRG	—
R126	090072	277k ·25% 15ppm MF	ACI	SEE DRG	—
R127	000107	100M 10% 1/4W CARBON	ALLEN BRADLEY	CB10	—
R128	000476	47M 10% 1/4W CARBON	ALLEN BRADLEY	CB10	1
R129	000222	2k2 5% 1/4W CARBON	MULLARD	CR25	—
R130	000471	470R 5% 1/4W CARBON	MULLARD	CR25	—
R131		NOT USED			—
R132		NOT USED			—
R133	011001	1k00 1% 1/8W 50ppm M/F	HOLCO	H8C	—
R134	011001	1k00 1% 1/8W 50ppm M/F	HOLCO	H8C	—
R135	000332	3k3 5% 1/4W CARBON	MULLARD	CR25	—
R136	000331	330R 5% 1/4W CARBON	MULLARD	CR25	—
R137	000333	33k 5% 1/4W CARBON	MULLARD	CR25	—
R138	000152	1k5 5% 1/4W CARBON	MULLARD	CR25	—

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AMD. 1104

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C1	120018	1µF 10% 63v POLYCARB	ASHCROFT	A2B152.1B	1
C2	120030	820nF 10% 63v POLYCARB	ASHCROFT	SEE DRG.	1
C3	120021	470nF 10% 63v POLYCARB	ASHCROFT	A2B47.11B	2
C4	120024	5nF 10% 63v POLYCARB	ASHCROFT	A2B68.21B	1
C5	120020	220nF 10% 63v POLYCARB	ASHCROFT	A2B22.11B	1
C6	150012	10µF 20% 35v DIP TANT	UNION CARBIDE	KR10E35	1
C7	120021	470nF 10% 63v POLYCARB	ASHCROFT	A2B47.11B	—
C8	102680	68pF 5% 500v CER DISC	ITT	CD10	2
C9	102680	68pF 5% 500v CER DISC	ITT	CD10	—
C10	102331	330pF 10% 500v CER DISC	ITT	CD10	1
C11	150020	10µF 20% 25v DIP TANT	UNION CARBIDE	K10E25	7
C12	110013	100nF 20% 250v POLYESTER	MULLARD	C280AEP100k	5
C13	150020	10µF 20% 25v DIP TANT	UNION CARBIDE	K10E25	—
C14	150020	10µF 20% 25v DIP TANT	UNION CARBIDE	K10E25	—
C15	101103	10nF 25% 250v CER DISC	ITT	CD10	
C16	150003	47µF 20% 6V3 DIP TANT	UNION CARBIDE	K47E6V3	1
C17	102101	100pF 10% 500v CER DISC	ITT	CD10	1
C18	130070	13pF ±1pF 160v POLYSTYRENE	SUFLEX	HS13/1-7/160	1
C19		NOT USED			—
C20		NOT USED			—
C21	110013	100nF 20% 250v POLYESTER	MULLARD	C280AEP100k	—
C22	102150	15pF 5% 500v CER DISC	ITT	CD10	2
C23	102150	15pF 5% 500v CER DISC	ITT	CD10	—

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
C24	102478	4p7F ±.5pF 500v CER DISC	ITT	CD08	2
C25	102478	4p7F ±.5pF 500v CER DISC	ITT	CD08	—
C26	150020	10µF 20% 25v DIP TANT	UNION CARBIDE	K10E25	—
C27	150020	10µF 20% 25v DIP TANT	UNION CARBIDE	K10E25	—
C28		NOT USED			—
C29	130071	150pF 1% 160v POLYSTYRENE	SUFLEX	HSQ150/1-7/160	2
C30	130013	18pF ±1pF 160v POLYSTYRENE	SUFLEX	HS	1
C31	110013	100nF 20% 250v POLYESTER	MULLARD	C280AEP100k	—
C32	110035	220nF 20% 63V POLYESTER	WIMA	MKS2 MIN	2
C33	110035	220nF 20% 63v POLYESTER	WIMA	MKS2 MIN	—
C34	102220	22pF 5% 500V CER DISC	ITT	CD10	3
C35		NOT USED			—
C36		NOT USED			—
C37		NOT USED			—
C38		NOT USED			—
C39		NOT USED			—
C40		NOT USED			—
C41	102101	100pF 10% 500v CER DISC	ITT	CD10	1
C42	130072	9p1F ±.5pF 160v POLYSTYRENE	SUFLEX	HS 9.1/.5-7/160	1
C43	130071	150pF 1% 160v POLYSTYRENE	SUFLEX	HSQ150/1-7/160	—
C44	150020	10µF 20% 25v DIP TANT	UNION CARBIDE	K10E25	—
C45	102100	10pF 5% 500v CER DISC	ITT	CD10	1
C46		NOT USED			—

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C47	101103	10nF 25% 250v CER DISC	ITT	CD10	—
C48	140035	10nF 1% 125v SILV. MICA	ITT	454/274	1
C49	140034	1nF 1% 300v GLASS	ELECTROSIL	CYFM15	1
C50	110013	100nF 20% 250v POLYESTER	MULLARD	C280AE P100k	—
C51	140033	91pF 1% 500v GLASS	ELECTROSIL	CYFM10	1
C52	110026	6n8F 20% 100v POLYESTER	WIMA	FKS2 MKH	1
C53	101103	10nF 25% 250v CER DISC	ITT	CD10	—
C54	101103	10nF 25% 250v CER DISC	ITT	CD10	—
C55	140039	15pF 5% 500v GLASS	ELECTROSIL	CYFM10	2
C56	150020	10µF 20% 25v DIP TANT	UNION CARBIDE	K10E25	—
C57	120001	220nF 10% 1kV POLYCARB	SUFLEX	SN1380	1
C58	140031	13pF 5% 500v GLASS	ELECTROSIL	CYFM10	1
C59	140032	18pF 10% 500v GLASS	ELECTROSIL	CYFM10	1
C60	140039	15pF 5% 500v GLASS	ELECTROSIL	CYFM10	—
C61		NOT USED			—
C62	140036	25pF 1kV TRIMMER	JACKSON	TETFER VPC 5646	2
C63	140036	25pF 1kV TRIMMER	JACKSON	TETFER VPC 5646	—
C64		NOT USED			—
C65		NOT USED			—
C66	102220	22pF 5% 500v CER DISC	ITT	CD10	—
C67	102220	22pF 5% 500v CER DISC	ITT	CD10	—
C68		NOT USED			—
C69		NOT USED			—

NOTES.

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C70		NOT USED			—
C71	102330	33pF 5% 500v CER DISC	ITT	CD10	1
C72	110013	100nF 20% 250v POLYESTER	MULLARD	C280AE P100K	—
C73	102471	470pF 10% 500v CER DISC	ITT	CD10	1

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D1	220010	Si HOT CARRIER DIODE	HP	HSCH1001/IN6263	3
D2	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	4
D3	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	–
D4	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	–
D5		NOT USED			–
D6	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	–
D7	210100	10v 400mW ZENER	MULLARD	BZY88C10	1
D8	220010	Si HOT CARRIER DIODE	HP	HSCH1001/IN6263	–
D9	220010	Si HOT CARRIER DIODE	HP	HSCH1001/IN6263	–
D10		NOT USED			–
D11	220021	QUAD 29pF VARICAP DIODE	THOMPSON-CSF	BB109G4	SET OF 4
D12		NOT USED			–
D13	200001	75mA 75V GP Si DIODE	FAIRCHILD	IN4148	2
D14	220020	FET DIODE 100pA IR	TELEDYNE	PAD100	3
D15	220020	FET DIODE 100pA IR	TELEDYNE	PAD100	–
D16	200001	75mA 75v GP Si DIODE	FAIRCHILD	IN4148	–
D17	220020	FET DIODE 100pA IR	TELEDYNE	PAD100	–

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
Q1	230002	N-CHAN JFET	TELEDYNE	U1994JF	3
Q2	230002	N-CHAN JFET	TELEDYNE	U1994JF	–
Q3	230027	N-CHAN JFET	TELEDYNE	U3114JF	1
Q4		NOT USED			–
Q5		NOT USED			–
Q6		NOT USED			–
Q7	240013	Si NPN TRANSISTOR	NATIONAL	BC184C/TO18	1
Q8	250008	Si PNP TRANSISTOR	NATIONAL	BC214C/TO18	3
Q9		NOT USED			–
Q10		NOT USED			–
Q11	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	5
Q12	240006	Si NPN TRANSISTOR	NATIONAL	2N3904/TO18	4
Q13		NOT USED	NATIONAL	BC214C/TO18	–
Q14		NOT USED	NATIONAL	BC184C/TO18	–
Q15	240006	Si NPN TRANSISTOR	NATIONAL	2N3904/TO18	–
Q16	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	–
Q17	240006	Si NPN TRANSISTOR	NATIONAL	2N3904/TO18	–
Q18	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	–
Q19	230035	N-CHAN JFET	TELEDYNE	U1897JF	1
Q20	250008	Si PNP TRANSISTOR	NATIONAL	BC214C/TO18	–
Q21	250008	Si PNP TRANSISTOR	NATIONAL	BC214C/TO18	–
Q22	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	–
Q23	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	–

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
Q24	240006	Si NPN TRANSISTOR	NATIONAL	2N3904 / TO18	–
Q25		NOT USED			–
Q26		NOT USED			–
Q27		NOT USED			–
Q28		NOT USED			–
Q29		NOT USED			–
Q30		NOT USED			–
Q31	230002	N-CHAN JFET	TELEDYNE	U1994 JF	–
Q32	230031	N-CHAN DUAL JFET	TELEDYNE	SU2656	2
Q33	240020	Si NPN DUAL TRANSISTOR	ANALOGUE DEVICES	AD812	1
Q34	230031	N-CHAN DUAL JFET	TELEDYNE	SU2656	–

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J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
M1	260027	714 OP AMP	FAIRCHILD	μA714HC	2
M2	260027	714 OP AMP	FAIRCHILD	μA714HC	–
M3	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076BCP	2
M4	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076BCP	–
M5	280011	DUAL D FLIP-FLOP	MOTOROLA	MC14013BCP	1
M6	290026	RMS KIT	DATRON	SEE DRG	–
M7	270059	7x DARLINGTON DRIVER	SPRAGUE / EXAR	ULN2004A / XR2204CP	1
M8	260025	101 OP AMP	NATIONAL	LM101AH	3
M9	260025	101 OP AMP	NATIONAL	LM101AH	–
M10		NOT USED			–
M11	260025	101 OP AMP	NATIONAL	LM101AH	–
RL1		NOT USED			–
RL2 (1)	330003	RELAY 2P2W CROSS BAR	P & B	RIO-E1-L2-Q5-BK(25207)	2
RL3 (1)	330003	RELAY 2P2W CROSS BAR	P & B	RIO-E1-L2-Q5-BK(25207)	–
RL4	330012	RELAY REED 1A GUARDED	HAMLIN	HE721A5134	3
RL5	330012	RELAY REED 1A GUARDED	HAMLIN	HE721A5134	–
RL6	330012	RELAY REED 1A GUARDED	HAMLIN	HE721A5134	–

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
TP's, TL's.	540002	22 SWG. TINNED COPPER WIRE			A/R
	590004	SLEEVE — PTFE	HELLERMANN ELECTRIC	FE10	A/R
J1	605002	16 WAY DIL LOW PROFILE SKT.	JERMYN OR ANTIFERENCE	A23-200Y/Y OR ICN-163-S3	1
J2	605052	8 WAY POLARISED SOCKET	MOLEX	(22-01-2085) 6471-8-1	1
	400379/L	WIRE/TERMINAL ASSY.			1
	410136-4	PCB			1
	450249-3	GUARD SHIELD			1
	459112-2	RELAY BRACKET			2
	605056	CRIMP TERMINAL	MOLEX	4809-TL	1
	540008	7/0·2 PTFE INSULATED (WHITE) WIRE			A/R
	590001	SLEEVE MAX. CABLE Ø3·0	HELLERMAN ELECTRIC	HIS×20mm BLACK HELSYN	7
	571110/B	RIBBON CABLE Assy	DATRON		1
	602001	FSV TERMINAL	MOLEX	02-04-1875	2
	602004	BREAKAWAY TERMINAL STRIP	MOLEX	05-30-0001	16
	605037	14 PIN DIL SOCKET	ASTRALUX	ICL 143-S8T	1
	605038	16 PIN DIL SOCKET	ASTRALUX	ICL 163-S6T	3
	605057	CRIMP TERMINAL	MOLEX	4809-GL	1
	606005	RED CLIP FOR 605002	ANTIFERENCE	RC-74	1
	611007	SCREW M3×6mm STEEL POZI-	CSK ZN/PLATED GKN		3
	611016	SCREW M3×8mm STEEL POZI-	PAN ZN/PLATED GKN		5

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	612021	STANDOFF M3×16 HEX STEEL	HARWIN	R6077-M3	3
	613005	WASHER M3 INT./SHAKEPROOF ST.	GKN DISTRIBUTORS	ZINC PLATED	5
	613014	WASHER M2·5 INT/SHAKEPROOF ST.	GKN DISTRIBUTORS	ZINC PLATED	2
	615002	NUT M3 FULL HEX STEEL		ZINC PLATED	2
	615005	NUT 3-48 UNC FULL HEX.ST.		ZINC PLATED	2
	617010	NYLATCH PLUNGER HN3P	ORDER FROM C.J.FOX & SONS	HN3P-32-4-1	4
	617011	NYLATCH GROMMET HN3G	ORDER FROM C.J.FOX & SONS	HN3G-32-1	4
	620003	SOLDER PCB TERMINAL LUG	HARWIN	H 2105A	2
	620005	CLOVERLEAF PTFE TERMINAL	SEALECTRO	FTE 15 P20	12
	630107	BRASS STRIP ·375mm THK #15-S	RIGHTON	½ HARD	130mm

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
R1		NOT USED			
R2	090001	P.T.C THERMISTOR	MULLARD	VA8650	2
R3	090044	4M0 1% MF	ACI	1	(1 SET) R3 R4
R4		3K94 1% MF	ACI		–
R5		NOT USED			–
R6		NOT USED			–
R7		NOT USED			–
R8	010761	9K76 1% 50ppm M.F.	HOLCO	H8	1
R9	090001	P.T.C. THERMISTOR	MULLARD	VA8650	–
R10		NOT USED			–
R11	000106	10M 5% ¼W CARBON	MULLARD	CR25	1
R12	000563	56K " " "	"	"	2
R13	000563	56K " " "	"	"	–
R14	000104	100K " " "	"	"	7
R15		NOT USED			–
R16		NOT USED			–
R17		NOT USED			–
R18	000107	100M 10% ¼W CARBON	ALLEN BRADLEY	CB10	1
R19	000104	100K 5% ¼W CARBON	MULLARD	CR25	–
R20	041505	15M 1% 100ppm CF	ALLEN BRADLEY	CC	2
R21	041505	15M " " "	"	"	–
R22	000102	1k 5% ¼W CARBON	MULLARD	CR25	2
R23	000391	390R " " "	"	"	1

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TITLE 1065 OHMS P.C.B ASSY

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SHEET 2 OF 12

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R24	070083	57K77 0·1% WIREWOUND	MANN		1
R25	070084	577K7 0·1% WIREWOUND	MANN		1
R26	063203	20K POT CERMET	BECKMANN	72P	1
R27	063204	200K " "	"	"	1
R28		NOT USED			–
R29	070137	6k420 0·1% WIREWOUND	MANN		1
R30		NOT USED			–
R31		NOT USED			–
R32	000332	3K3 5% ¼W CARBON	MULLARD	CR25	1
R33	000154	150K 5% ¼W CARBON	MULLARD	CR25	1
R34		NOT USED			–
R35	000125	1M2 5% ¼W CARBON	MULLARD	CR25	1
R36	041005	10M 1% 100ppm CF	ALLEN BRADLEY	CC	1
R37	090049	18M MATCHED PAIR	HOLCO		1 PAIR
R38		18M			–
R39		NOT USED			–
R40		NOT USED			–
R41	000473	47K 5% ¼W CARBON	MULLARD	CR25	2
R42	000624	620K " " "	"	"	1
R43	000473	47K " " "	"	"	–
R44		NOT USED			–
R45	000102	1K 5% ¼W CARBON	MULLARD	CR25	–
R46		NOT USED			–

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DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
R47	000823	82k 5% ¼W CARBON	MULLARD	CR25	1
R48	000105	1M 5% ¼W CARBON	MULLARD	CR25	3
R49		NOT USED			–
R50		NOT USED			–
R51	000105	1M 5% ¼W CARBON	MULLARD	CR25	–
R52	000104	100K " " "	"	"	–
R53	000273	27K " " "	"	"	2
R54	000104	100K " " "	"	"	–
R55	000105	1M " " "	"	"	–
R56	000824	820K " " "	"	"	1
R57	000104	100K " " "	"	"	–
R58	000273	27K " " "	"	"	–
R59	000104	100K " " "	"	"	–
R60	000123	12K " " "	"	"	1
R61	000334	330K " " "	"	"	1
R62		NOT USED			–
R63	000104	100k 5% ¼W CARBON	MULLARD	CR25	–
R64	000333	33K " " "	"	"	1
R65	000272	2K7 " " "	"	"	1
R66		NOT USED			–
R67	000474	470K 5% ¼W CARBON	MULLARD	CR25	1
R68	000124	120K " " "	"	"	1
R69	000103	10k " " "	"	"	2

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DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
R70	000221	220R 5% ¼W CARBON	MULLARD	CR25	1
R71	000103	10k 5% ¼W CARBON	MULLARD	CR25	–
ANI	090017	100k x 7 2% NETWORK	BECKMAN	764-1-R100k	1

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DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
C1		NOT USED			–
C2	120026	680pF 20% 100V POLYCARB	WIMA	FKC-2 MIN	1
C3	102470	47pF 500V CER DISC	ERIE	801	2
C4	102470	47pF 500V CER DISC	ERIE	801	–
C5		NOT USED			–
C6	101103	·01μF 250V CER DISC	ERIE	801	2
C7	120022	1nSF 20% 100V POLYCARB	WIMA	FKC2 MIN	1
C8	120006	470nF 10% 160V POLYCARB	ASHCROFT	A2B4715B	2
C9	120006	470nF 10% 160V POLYCARB	ASHCROFT	A2B4715B	–
C10	110013	0·1μF 10% 250V POLYESTER	MULLARD	C2B0AE/P100K	2
C11		NOT USED			–
C12		NOT USED			–
C13	150022	2μ2F 20% 35V DIP. TANT	UNION CARBIDE	K2R2E35	1
C14		NOT USED			–
C15	102100	10pF 500V CER DISC	ERIE	801	2
C16	102100	10pF " " "	"	"	–
C17	102102	1nF " " "	"		1
C18	120021	0·47μF 10% 63V POLYCARB	ASHCROFT	A2B4711B	1
C19	150014	680nF 20% 35V DIP TANT	UNION CARBIDE	KR68E35	1
C20		NOT USED			–
C21	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	2
C22	101103	·01μF 250V CER DISC	ERIE	801	–
C23	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	–

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JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
C24	102101	100pf 10% 500V Cer Disc	I.T.T	CD10	3
C25	102101	100pf " " " "	"	"	–
C26	102101	100pF " " " "	"	"	–
C27	110013	100nF 20% 250v POLYESTER	MULLARD	C280AEP100K	–
D1		NOT USED			–
D2	213002	5V1 5W ZENER	MOTOROLA	IN5338	2
D3		NOT USED			–
D4		NOT USED			–
D5		NOT USED			–
D6		NOT USED			–
D7		NOT USED			–
D8		NOT USED			–
D9		NOT USED			–
D10	213002	5V1 5W ZENER	MOTOROLA	IN5338	–
D11		NOT USED			–
D12		NOT USED			–
D13	200005	30mA 25v GP. Ge DIODE	NEWMARKET	OA47	1
D14		NOT USED			–
D15	200008	Si Low LEAKAGE	FAIRCHILD	IN458A	1
D16		NOT USED			–
D17		NOT USED			–

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JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy.
D18	200001	Si G.P.	FAIRCHILD	IN4148	5
D19		NOT USED			–
D20		NOT USED			–
D21	200001	Si G.P	FAIRCHILD	IN4148	–
D22	200001	Si "	"	"	–
D23	200001	Si "	"	"	–
D24		NOT USED			–
D25		NOT USED			–
D26	200001	Si. GP.	FAIRCHILD	IN4148	–
Q1		NOT USED			–
Q2		NOT USED			–
Q3		NOT USED			–
Q4		NOT USED			–
Q5	230002	N-CHAN J FET	SILICONIX	U1994E	5
Q6		NOT USED			–
Q7		NOT USED			–
Q8	230002	N-CHAN J FET	SILICONIX	U1994E	–
Q9	230002	" "	"	"	–
Q10	240017	Si NPN SUPERMATCH PAIR	NATIONAL	LM394	1
Q11		NOT USED			

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
Q12		NOT USED			–
Q13		NOT USED			–
Q14		NOT USED			–
Q15		NOT USED			–
Q16		NOT USED			–
Q17	240001	Si NPN	NATIONAL	BC184	2
Q18	240001	Si NPN	NATIONAL	BC184	–
Q19		NOT USED			–
Q20	230002	N-CHAN J FET	SILICONIX	U1994E	–
Q21	230002	N-CHAN J FET.	SILICONIX	U1994E	–
Q22		NOT USED			–
Q23		NOT USED			–
Q24		NOT USED			–
Q25		NOT USED			–

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DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
M1	280022	QUAD BILATERAL SWITCH	MOTOROLA	MC 14016 BCP	2
M2	280022	" " "	"	"	—
M3	260022	OP AMP	NATIONAL	LF 355	1
M4	260027	OP AMP	FAIRCHILD	UA 714	1
M5	280025	QUAD ANALOGUE SWITCH	MOTOROLA	MC 14066 BCP	1
M6	280072	M'STABLE / MSTABLE M'VIBR	R.C.A	CD 4047 AE	1
M7	280015	QUAD LATCH	MOTOROLA	MC 14076 BCP	2
M8	280015	" "	"	"	—
M9	280011	DUAL D FLIP FLOP	MOTOROLA	MC 14015 BCP	1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS	1													
E.C.O.														
DATE														
CHKD														

DATE 14.7.80
DR'AWN IL
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1065 OHMS PCB ASSY

DRAWING NUMBER 400426

SHEET 10 OF 12

A.W. 3.80

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
RL1 (1)	330001	RELAY 4P 2W CROSSBAR	P&B	RIO-EI-L4-G2·5K	1
	400379/2	WIRE / TERMINAL ASSY			6
	410099-5A	OHMS P.C.B.			1
	459112	RELAY BRACKET.	KDP		1
	540008	7/0·2 PTFE INSULATED WHITE.		TYPE C	280mm.
	540002	22 SWG TINNED COPPER WIRE			A/R
	590001	SLEEVE MAX CABLE Ø 3·0	HELLERMANN ELECTRIC	H15 x 20mm BLK HELSYN	9
	571110/8	16 WAY RIBBON CABLE ASSY.	3M		1
	605002	16 WAY DIL LOW PROFILE SKT	JERMYN or ANTIFERENCE	A23-2001/Y or ICN-163-33	1
	605087	14 WAY DIL SOCKET	ASTRALUX	ICL-143-33T.	5
	605086	16 WAY DIL SOCKET	ASTRALUX	ICL-163-66T.	2
VI	605053	12 WAY POLARISED SOCKET	MOLEX	22-01-2125	1

NOTES. (1) ALTERNATIVE RELAY 330016 (OMRON)

SEE SHEET 2 FOR LATEST ISSUE

ISS														
E.C.O.														
DATE														
CHKD														

DATE 14.7.80
DR'AWN IL
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1065 OHMS P.C.B. ASSY.

DRAWING NUMBER 400426

SHEET 11 OF 12

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	G06005	CLIP FOR G05002	ANTIFERENCE	RC-7	1
	G11004	SCREW M3 X 6mm STEEL POZI PAN ZINC PLATED . GKN			1
	G15003	WASHER M3 INT / SHAKEPROOF	GKN DISTRIBUTORS	ZINC PLATED	2
	G15002	NUT M3 FULL HEX STEEL		ZINC PLATED	1
	G15005	NUT 3-48 UNC FULL HEX	STEEL	" "	1
	G17010	NYLATCH PLUNGER HN3P	ORDER FROM C.J. FOX & SONS.	HN3P-32-4-1	4
	G17011	NYLATCH GROMMET HN3G		HN3G-32-1	4
	G20003	SOLDER TAG TERMINAL LUG	HARWIN	H2105A	8
	G30024	STANDARD STEATITE BEAD	PARK ROYAL PORCELAIN CO	TYPE No 2 (16 SWG)	8

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS														
E.C.O														
DATE														
CHKD														

DATE 14.7.80

DRAWN IL

CHECKED

APPROVED

DATE

datron ELECTRONICS LTD

TITLE 1065 OHMS PCB ASSY

DRAWING NUMBER 400426

SHEET 12 OF 12

J.W. 1164

DRAWING No 400295

FIRST USED ON

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

4 OFF STEEL M3x8mm SCREW. 611016.
9 OFF NYLON M3x8mm SCREW. 611037.
4 OFF STEEL SHAKEPROOF WASHER. 613008
9 OFF NYLON M3 WASHER . 613017
2 OFF STEEL M3 NUT . 615002
3 OFF NYLON M3 NUT . 615006.

ALL BURRS TO BE REMOVED

NOTES

C	UPDATED PCB 8.7.77 12 OFF	MD
	RELEASED TO PRODN 28-9-76	
2	ECO 783 CONFORMENT CHANGES	M
3	ECO 870 WARNING LABEL 4200801 ADDED 25 JAN 79 NO 5	
4	ECO 876, 882, 900 C6 ADDED J5 NOW GOLD ISSUE 4 PCB. U.12 & 13 ADDED R13 ADDED C8 MOVED R22 & R3 CHANGED G-6-79	M
5	ECO 951 & 964 PCB WAS ISS 4 J1, 8 & 14 SETS GOLD. DELETED I FUSE LINK WAS BRIGHT WIRE 8 PINS W1 WAS 2090-3 MICA WASHERS WERE 618004 BJ 31-10-79	M
6	ECO 1085 1097 2 OFF SOLDER PINS & 1 OFF 4 WAY WAFER (J13) DELETED IL 21 4 80	M

THIS HEATSINK HELD TO PCB BY
STEEL M3 x 8mm SCREWS
STEEL M3 SHAKEPROOF WASHERS

Q1 & M1 HELD TO HEATSINK WITH
NYLON M3 x 8mm SCREWS
NYLON M3 WASHERS
NYLON M3 NUTS.

1 off HEATSINK 450180

2 off MICA WASHER.

USE M3 x 8mm NYLON SCREWS
M3 NYLON WASHERS
M3 NYLON NUT

1 off MICA WASHER

3 off HEATSINK 450183

THESE 2 HEATSINKS HELD TO PCB WITH NYLON M3 x 8mm SCREWS & NYLON M3 WASHERS

M2 & M3 HELD TO HEATSINKS WITH STEEL M3 x 8mm SCREWS
STEEL M3 SHAKEPROOF WASHERS
STEEL M3 NUTS

FIT WARNING LABEL 4200801 IN APPROX POSITIONS SHOWN ON TRACK SIDE OF PCB IN MAINS AREA

HEATSINK COMPOUND ON BOTH SIDES OF MICA WASHERS ON Q1 & M1

SLEEVED

BLACK DOTS INDICATE THAT PIN HAS TO BE REMOVED BEFORE INSERTION INTO P.C.B.

J11 J12 & J13 USE GOLD FLAT PIN ASSY (PART No 604033) 4 off

TEST POINT

5mm

REAR PCB 410091-5

J2 (THESE 5 PINS MOUNTED ON UNDERSIDE OF PCB)

FIT M1 WASHER BEFORE Q1 WASHER

ALL LINKS & TEST POINTS USE 22 SWG TIN CU WIRE (RATSON PART No 540002)

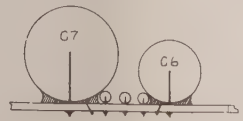
3 off MICA WASHER PART No 618007

FLAT PIN ASSY TIN (PART No 604032) 15 off

BACKPLATE INDICATES WHICH WAY THE PIN ASSY FITS INTO THE P.C.B

LINKS 1, 2 & 3 MUST BE SLEEVED USING 590004

R4, R5 & R6 ARE POSITIONED UNDER THE CURVE OF C6 & C7 (AS SHOWN BELOW)



THE 4 LARGE CAPACITORS C6, C7, C13 & C15 ARE TO BE BEDDED INTO SILICONE RUBBER COMPOUND PART No 900004 BEFORE SOLDERING THIS SHOULD FINISH UP AS ABOVE DRAWING

FOR 115 V OPERATION
REMOVE LK1, FIT LK2 & LK3

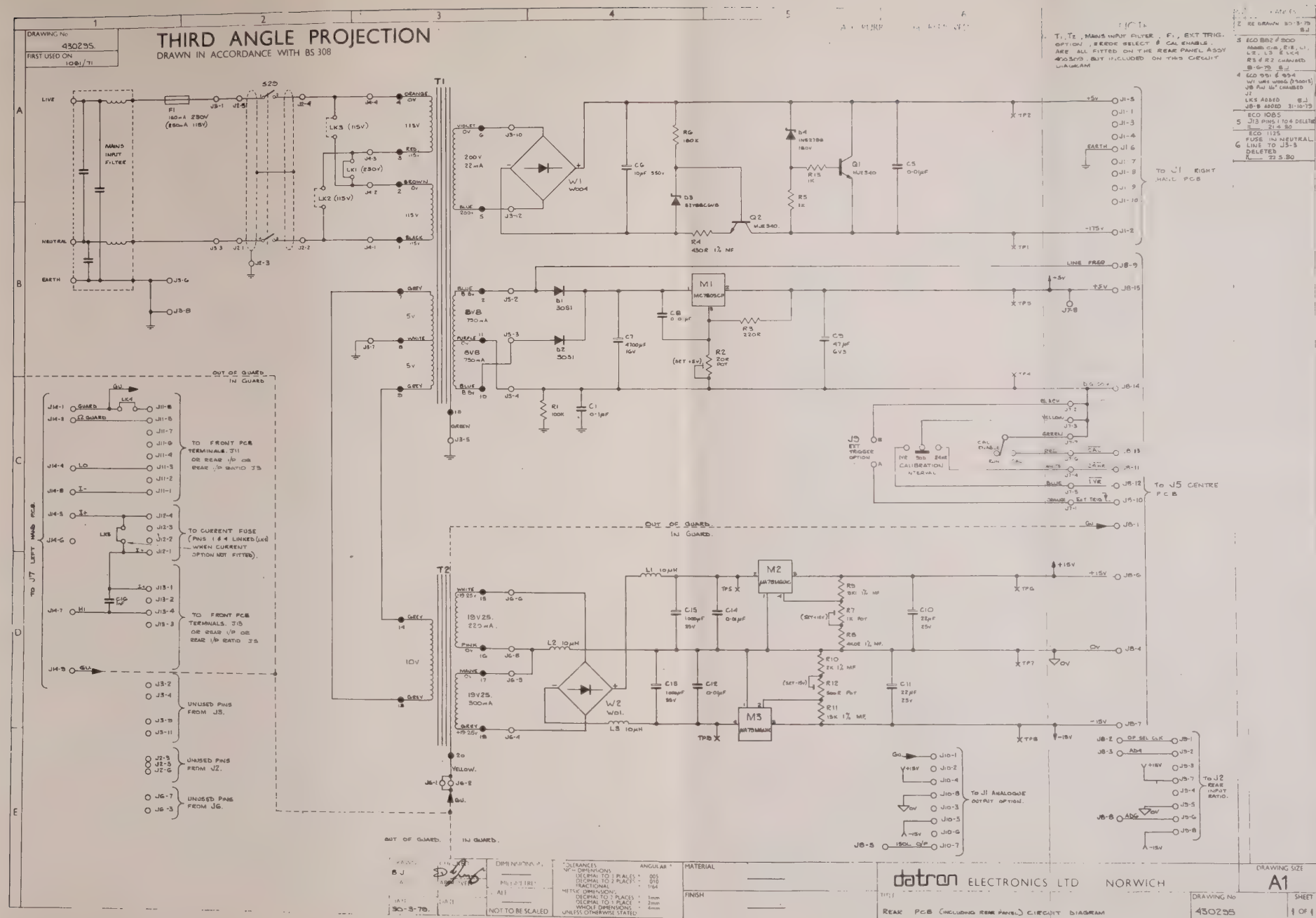
B J	26-4-78	2:1 NOT TO BE SCALED	TOLERANCES NON DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONS ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 6mm UNLESS OTHERWISE STATED	ANGULAR ±	MATERIAL FINISH	datron ELECTRONICS LTD. NORWICH.

TITLE: REAR P.C.B. ASSEMBLY 1061/1071

DRAWING SIZE A1

DRAWING No 400295

SHEET 1 OF 6


THIRD ANGLE PROJECTION
DRAWN IN ACCORDANCE WITH BS 308
DRAWING No 430295.
FIRST USED ON 1001/71
T1, T2, MAINS INPUT FILTER, F1, EXT TRIG. OPTION, FERRITE SELECT & CAL ENABLE ARE ALL FITTED ON THE REAR PANEL ASSY 430329, BUT INCLUDED ON THIS CIRCUIT DIAGRAM
ISSUE
2 RE DRAWN 30-3-79 BJ
3 ECO 882 & 900 RMKD C18, E18, L1, L2, L3 & LK4 R5 & R2 CHANGED 18-6-79 BJ
4 ECO 951 & 954 W1 WAS W004 (730015) J8 PW 16" CHANGED J7 LK5 ADDED BJ J8-8 ADDED 31-10-79
5 ECO 1085 J13 PINS 1 104 DELETED 11 21-4-80
6 ECO 1125 FUSE IN NEUTRAL LINE TO J3-3 DELETED R 23-5-80
LIVE
NEUTRAL
EARTH
MAINS INPUT FILTER
F1 160mA 230V (250mA 115V)
S2S
LK3 (115V)
LK1 (230V)
LK2 (115V)
ORANGE 0V 115V
RED 115V
BROWN 0V 115V
BLACK 115V
T1
VIOLET 0V
200V 22mA
BLUE 200V
W1 W004
C6 10μF 350V
R6 180K
D4 IN6278B 180V
R15 1K
Q1 MJE340
C5 0·01μF
D3 BZY88C6V8
Q2 MJE340
R4 430R 1% MF
R5 1K
TP2
TP1
+5V
-15V
EARTH
TO J1 RIGHT HAND PCB
GREY 5V
WHITE 5V
GREY 5V
BLUE 8·6V 730mA
PURPLE 0V
BLUE 8·6V 730mA
D1 3051
D2 3051
M1 MC7805CP
C8 0·01μF
C7 4700μF 16V
R3 220R
R2 20R POT (SET +5V)
C9 47μF 6V3
R1 100K
C1 0·1μF
TP4
TP5
LINE FREQ
J8-9
+5V
J8-15
J7-8
BLACK
YELLOW
GREEN
J5 EXT TRIGGER OPTION
CAL ENABLE
RED
BLUE
GREEN
J8-13
J8-11
J8-12
J8-10
EXT TRIG
To J5 CENTRE P C B
OUT OF GUARD. IN GUARD.
GU
J8-1
T2
WHITE 19V25.
PINK 0V
MAUVE 0V
GREY +19·25V
19V25. 220mA.
500mA
W2 WO1.
L1 10μH
L2 10μH
L3 10μH
M2 MA7815UC
M3 MA7915UC
C15 1000μF 25V
C14 0·01μF
C18 1000μF 25V
C12 0·01μF
C10 22μF 25V
C11 22μF 25V
R9 8K1 1% MF
R7 1K POT (SET +15V)
R8 4K08 1% MF
R10 2K 1% MF
R12 500R POT (SET -15V)
R11 15K 1% MF
TP6
TP7
TP8
+15V
0V
-15V
J8-6
J8-4
J8-7
GREY 14 10V GREY 12
YELLOW
GU.
J6-1 J6-2
J6-6 J6-8 J6-5 J6-4
OUT OF GUARD. IN GUARD.
GW
LK4
J14-1 GUARD
J14-3 EZ GUARD
J14-4 LO
J14-8 I-
J14-5 I+
J14-6
LK5
J14-7 HI
J14-8 GU
J11-6
J11-5
J11-7
J11-6
J11-4
J11-3
J11-2
J11-1
TO FRONT PCB TERMINALS J11 OR REAR I/P RATIO J3
J12-4
J12-3
J12-2
J12-1
TO CURRENT FUSE (PINS 1 & 4 LINKED (Ltd WHEN CURRENT OPTION NOT FITTED).
J13-1
J13-2
J13-4
J13-3
C16 1nF
TO FRONT PCB TERMINALS J13 OR REAR I/P OR REAR I/P RATIO J3
J3-2
J3-4
J3-10
J3-11
UNUSED PINS FROM J3.
J2-3
J2-5
J2-6
UNUSED PINS FROM J2.
J6-7
J6-3
UNUSED PINS FROM J6.
TO J7 LEFT HAND PCB.
J10-1 GU
J10-2 V+15V
J10-4
J10-8 V
J10-3 0V
J10-5 V-15V
J10-6
J8-5 ISOL O/P
J10-7
TO J1 ANALOGUE OUTPUT OPTION.
J8-2 OP SEL CLK
J8-3 ADA
J8-8 ADG
J9-1
J9-2
J9-3
J9-7 V+15V
J9-4
J9-5 0V
J9-6
J9-8 V-15V
TO J2 REAR INPUT RATIO.
DRAWN B J
DIMENSIONS IN MILLIMETRES
NOT TO BE SCALED
TOLERANCES ANGULAR
MATERIAL
FINISH
datron ELECTRONICS LTD NORWICH
REAR PCB (INCLUDING REAR PANEL) CIRCUIT DIAGRAM
DRAWING SIZE A1
DRAWING No 430295
SHEET 1 OF 1

DRAWING No 400296
FIRST USED ON 1061 /1071

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
C	
D	D.D.2.83 E 682 ADDED A NEW PCB B J 25-8-78
1	RELEASED TO PRODN 20-5-78
2	ECO 784 RIBBON CABLE MODS B.J 6-7-78
3	ECO 840 PCB MODS B.J 4.9.79
4	ECO 867 PCB UPDATE B.J 11-6-79 E ECO 1000 572130 changed to 572100/A GOLDPADS CLIPS REMOVED E ECO 875 J3, 4 & 5 NOW GOLD NOT TIN
5	ECO 992 25-10-79 PCB NO 1138-9A B.J PWB OF J5 ARRED PCB CUT OUT INCREASED IN DEPTH
6	ECO 1000 RIBBON CABLE ASSY WAS 572100/A 18.1.80
7	ECO 1102 PCB WAS ISSUE 5 14.4.80

1 OFF CABLE CLIP
(DATRON PART No 630023.)

CUT OFF PART SHOWN BY DOTTED LINE.
STICK ON OPPOSITE SIDE OF PCB TO COVER SOLDER JOINTS OF J3 AS SHOWN DOTTED.

RIBBON CABLE ASSY 572130/B

IMPORTANT

4 OFF AMP PIN (BLOCKS) PART No 604036 MUST BE AFFIXED FIRST.
ENSURE ALL PINS ARE SEATED TIGHT & FLAT TO P.C.B. BEFORE SOLDERING
NOTE. PINS ARE HELD TOGETHER BY A PLASTIC STRIP. THIS STRIP IS TO BE CUT TO SUIT THE AMOUNT OF PINS REQUIRED.

AFTER ASSEMBLY, THIS RIBBON CABLE IS TO BE TAPED TO THE PCB USING MASKING TAPE PART No G30099

CENTRES P.C.B 410092-5A

.22" UNSCREENED AREA OF PCB

5 OFF GOLD RIGHT ANGLED PIN ASSY (PART No 604035) PLACED TOGETHER AS SHOWN BELOW.

J4 ON OPPOSITE SIDE

J1 J3 J4 J5 G R1 R2 R3 TP1 TP2 25 15

TEST POINT (TP1 & TP2)
22 SWG TIN CU WIRE
PART No 640002

B.J.	DIMENSIONS IN MILLIMETRES	TOLERANCES IN "M DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	ANGULAR ± °	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
DATE 25-4-78	A1 2:1 NOT TO BE SCALED			FINISH	TITLE 1061/1071. CENTRE P.C.B ASSEMBLY.	DRAWING No 400296 SHEET 1 OF 2

DRAWING No. 430296

FIRST USED ON 1061 / 1071

THIRD ANGLE PROJECTION

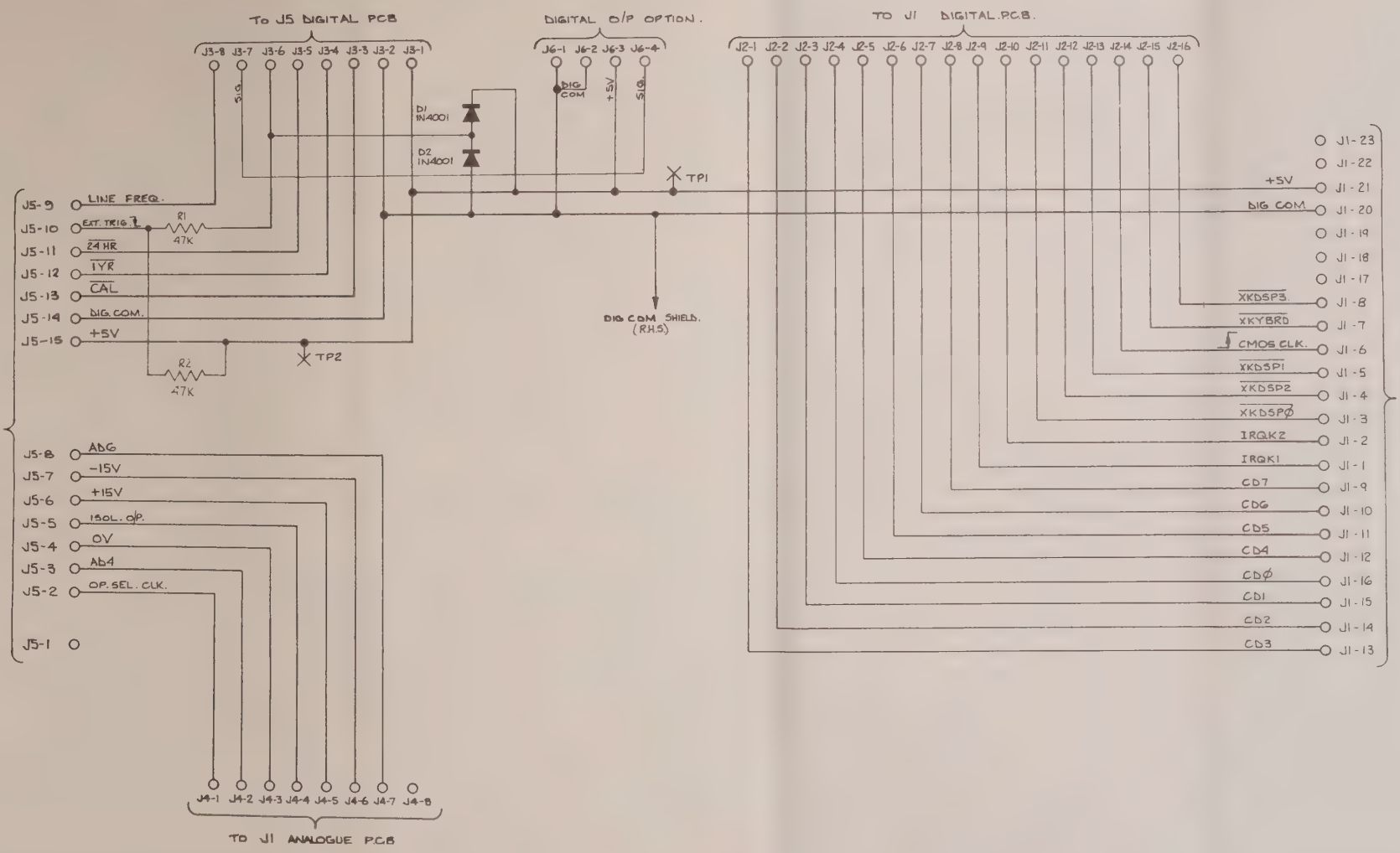
DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1 'IN GUARD' TRACKS TO BE ON CCT. SIDE (SHT. 2) & 'OUT OF GUARD' TRACKS TO BE ON THE COMP. SIDE (SHT. 3) OF P.C.B. WHERE POSSIBLE.

BS	CHANGES
D	
1	RELEASED TO PROD 29-9-78
2	ECO 848 J6-4 SIG JOINED TO J3-7 & J 4-5-79
3	ECO 852. J3-8 ADDED & J3-1 GND. DELETED 29-10-79



DRAWN	CHECKED
BJ.	DCJ
TRACED	APPROVED
DATE 30-5-78	DATE

DIMENSIONS IN MILLIMETRES

SCALE NOT TO BE SCALED

TOLERANCES ANGULAR ± ½°
INCH DIMENSIONS
DECIMAL TO 3 PLACES ± .005
DECIMAL TO 2 PLACES ± .010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 2 PLACES ± 1mm
DECIMAL TO 1 PLACE ± 2mm
WHOLE DIMENSIONS ± 4mm
UNLESS OTHERWISE STATED

MATERIAL

FINISH

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A2

TITLE CENTRE PCB SCHEMATIC 1061 / 1071

DRAWING No. 430296

SHEET 1 OF 3

DRAWING No 400297
FIRST USED ON 1061/71

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

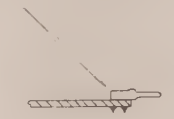
ISS	CHANGES
D	NEW ISSUE PC 8 BJ 24.8.78
1	RELEASED TO PRODN 25-9-78
2	ECO 857 PCB UPDATE BJ 11-6-79

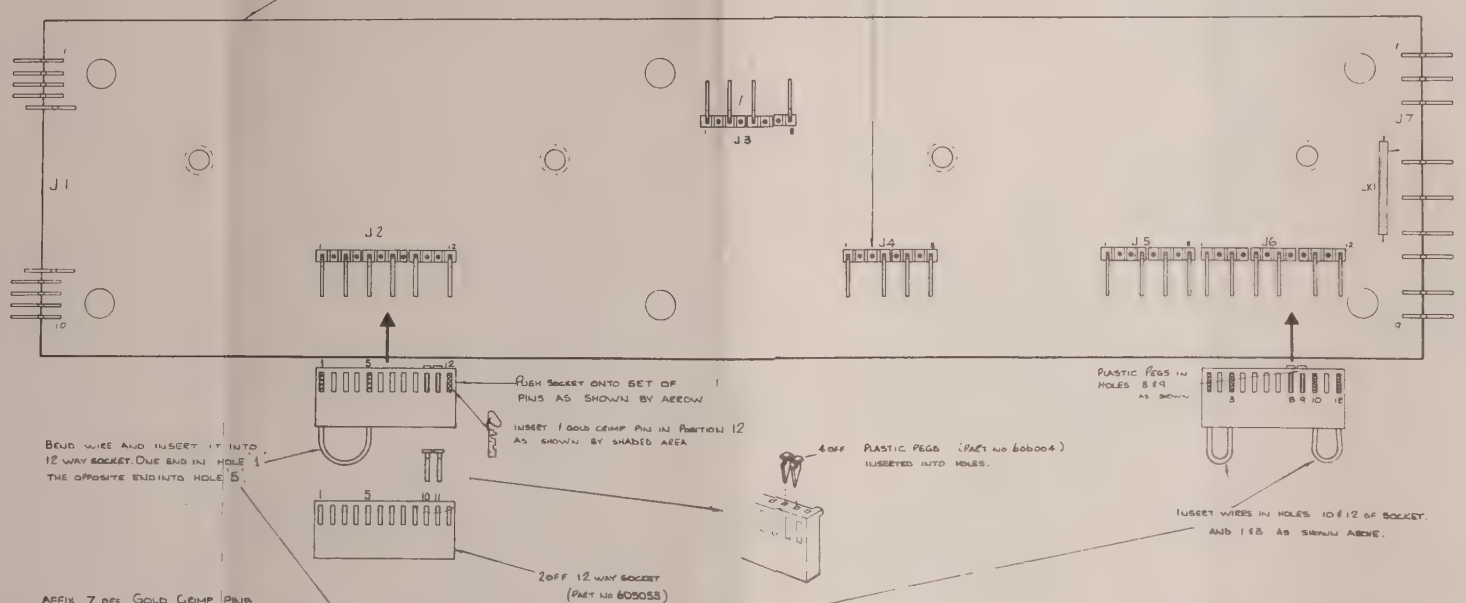
USE THE GOLD 4 RIGHT ANGLED PIN ASSY (PART NO 604035). 12 OFF PLACED TOGETHER TO MAKE UP THE REQUIRED AMOUNT OF CONTACTS (SHOWN BELOW)
REMOVE PINS IN PLACES SHOWN BY BLACK DOTS

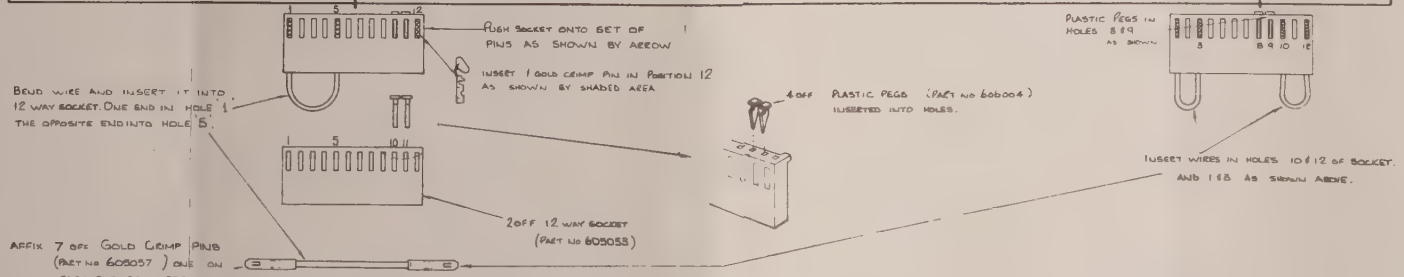
IMPORTANT

2 OFF AMP PINS (PART No 604086) MUST BE AFFIXED FIRST
ENSURE ALL PINS ARE SEATED TIGHT & FLAT TO PCB BEFORE SOLDERING

NOTE PINS ARE HELD TOGETHER BY A PLASTIC STRIP THIS STRIP IS TO BE CUT TO SUIT THE AMOUNT OF PINS REQUIRED






BEND WIRE AND INSERT IT INTO 12 WAY SOCKET. ONE END IN HOLE 1 THE OPPOSITE END INTO HOLE 5.
PUSH SOCKET ONTO SET OF PINS AS SHOWN BY ARROW
INSERT 1 GOLD CRIMP PIN IN POSITION 12 AS SHOWN BY SHADED AREA
4 OFF PLASTIC PEGS (PART NO 606004) INSERTED INTO HOLES.
PLASTIC PEGS IN HOLES 8 & 9 AS SHOWN
INSERT WIRES IN HOLES 10 & 12 OF SOCKET. AND 1 & 3 AS SHOWN ABOVE.
2 OFF 12 WAY SOCKET (PART NO 605058)
AFFIX 7 OFF GOLD CRIMP PINS (PART NO 608057) ONE ON EACH END OF WIRES, THE 7TH INTO PIN 12 OF SOCKET.
3 OFF 40mm OF BROWN WIRE. (PART NO 510111) AND STRIP 3mm FROM EACH END (AS SHOWN).
40

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
B.J. DATE 21-4-78	DATE	MILLIMETRE SCALE 2:1 NOT TO BE SCALED	INCH DIMENSIONS: DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; METRIC DIMENSIONS: DECIMAL TO 1 PLACE ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm; UNLESS OTHERWISE STATED; ANGULAR ± °	FINISH

datron ELECTRONICS LTD. NORWICH.

TITLE 1061/71 L.H. P.C.B. ASSEMBLY

DRAWING SIZE A1

DRAWING No 400297

SHEET 1 OF

DRAWING No.	FIRST USED ON
430297	1061/1071

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

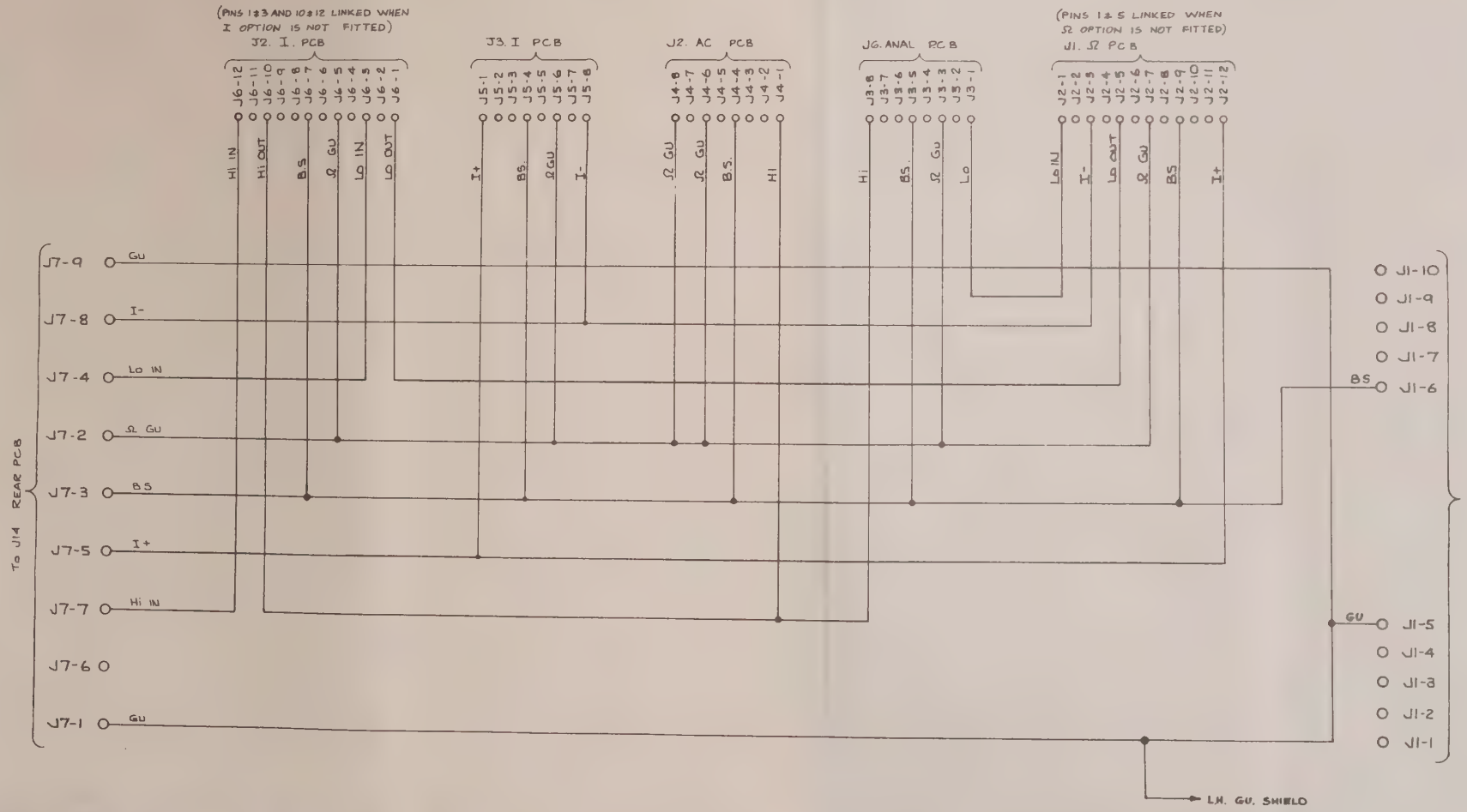
1/ ALL CIRCUIT TO BE ON THE COMPONENT (SHEET 3) SIDE OF P.C.B WHERE POSSIBLE.

2/ INPUT GUARD VIA J7-1 TO PROVIDE ELECTROSTATIC SHIELD ON 'CIRCUIT' (SHEET 2) SIDE OF P.C.B. WHERE POSSIBLE.

3/ B.S. VIA J3-5 TO ENCLOSE Hi AND I+ CIRCUITS ON P.C.B WHERE POSSIBLE

4/ Ω GUARD VIA J3-3 TO ENCLOSE LO & I- CIRCUITS ON P.C.B WHERE POSSIBLE.

ISS	CHANGES
D	
1	RELEASED TO PROD W/E 29-9-78



DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
B.J.		MILLIMETRES	ANGULAR ± ½°	
TRACED	APPROVED	SCALE	INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64	FINISH
DATE 30.5.78	DATE	NOT TO BE SCALED	METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	

datron ELECTRONICS LTD. NORWICH.

TITLE: L.H. P.C.B. SCHEMATIC 1061/1071

DRAWING SIZE: A2

DRAWING No. 430297

SHEET 1 OF 1

DRAWING No. 400298

FIRST USED ON 1061/71

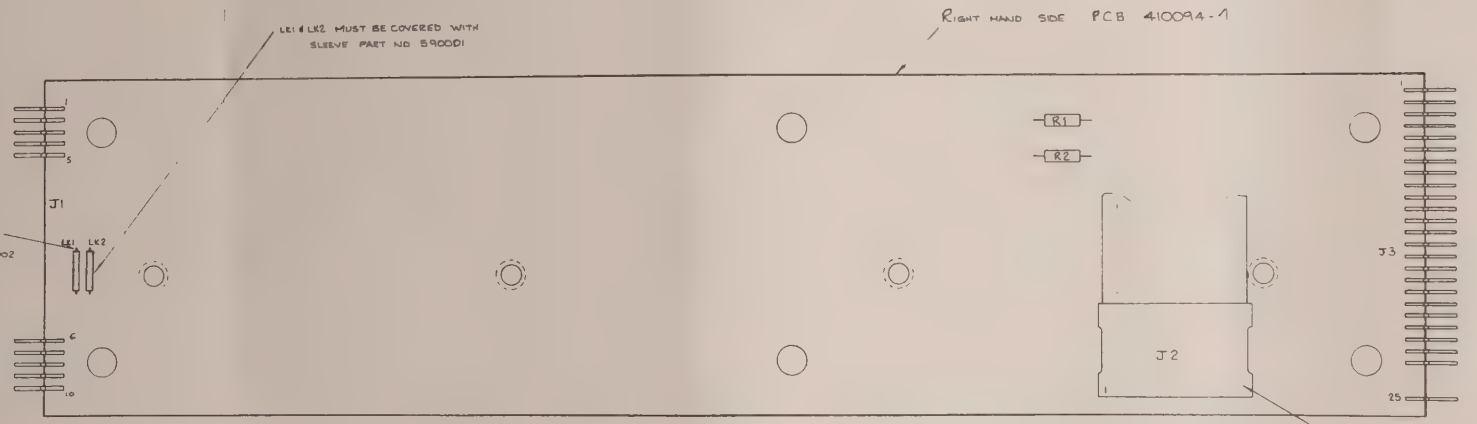
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS	CHANGES
C	
D	NEW ISSUE PCB BJ 24.8.78
1	RELEASED TO PRODN 25-9-78
2	ECO 850 4.5.79 UPDATED PCB J1-6 WAS REMOVED
3	ECO 867 & 904 BJ UPDATED PCB CABLE ASSY 400365 CHANGED TO 574250/A
4	ECO 943 10.9.79 RIBBON CABLE ASSY WAS 574250/A BJ



RIBBON CABLE ASSY
PART No. 400365

NOTE WHEN SOLDERING CABLE PLUG INTO BOARD ENSURE THAT THE PLUG BODY SITS FLAT AGAINST PCB

AFTER ASSEMBLING PCB WRAP THE ABOVE RIBBON CABLE ROUND THE PCB AND TAPE DOWN USING MASKING TAPE PART No G30099

IMPORTANT

- AMP PINS (DATRON PART No. 604036.) 4 OFF MUST BE AFFIXED TO P.C.B FIRST. ENSURE ALL PINS ARE SEATING TIGHTLY AND FLAT TO PCB BEFORE SOLDERING

NOTE PINS ARE HELD TOGETHER BY PLASTIC STRIP THIS STRIP IS TO BE CUT TO SUIT THE AMOUNT OF PINS REQUIRED

FOR EXAMPLE. ABOVE 2 BLOCKS OF 5 PINS ARE REQUIRED, THEREFORE STRIP OF 10 PINS TO BE CUT IN HALF

DRAWN BJ DATE 20.4.78 | CHECKED | APPROVED | DIMENSIONS IN MILLIMETRES | SCALE 2:1 NOT TO BE SCALED

TOLERANCES
INCH DIMENSIONS
DECIMAL TO 1 PLACES ± .005
DECIMAL TO 2 PLACES ± .010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 1 PLACE ± 1mm
DECIMAL TO 1 PLACE ± 2mm
WHOLE DIMENSIONS ± 4mm
UNLESS OTHERWISE STATED
ANGULAR ± °

MATERIAL

FINISH

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A1

TITLE 1061/71. R.H. PCB ASSEMBLY.

DRAWING No 400298

SHEET 1 of 2

DRAWING No. 430298

FIRST USED ON 1061 / 1071

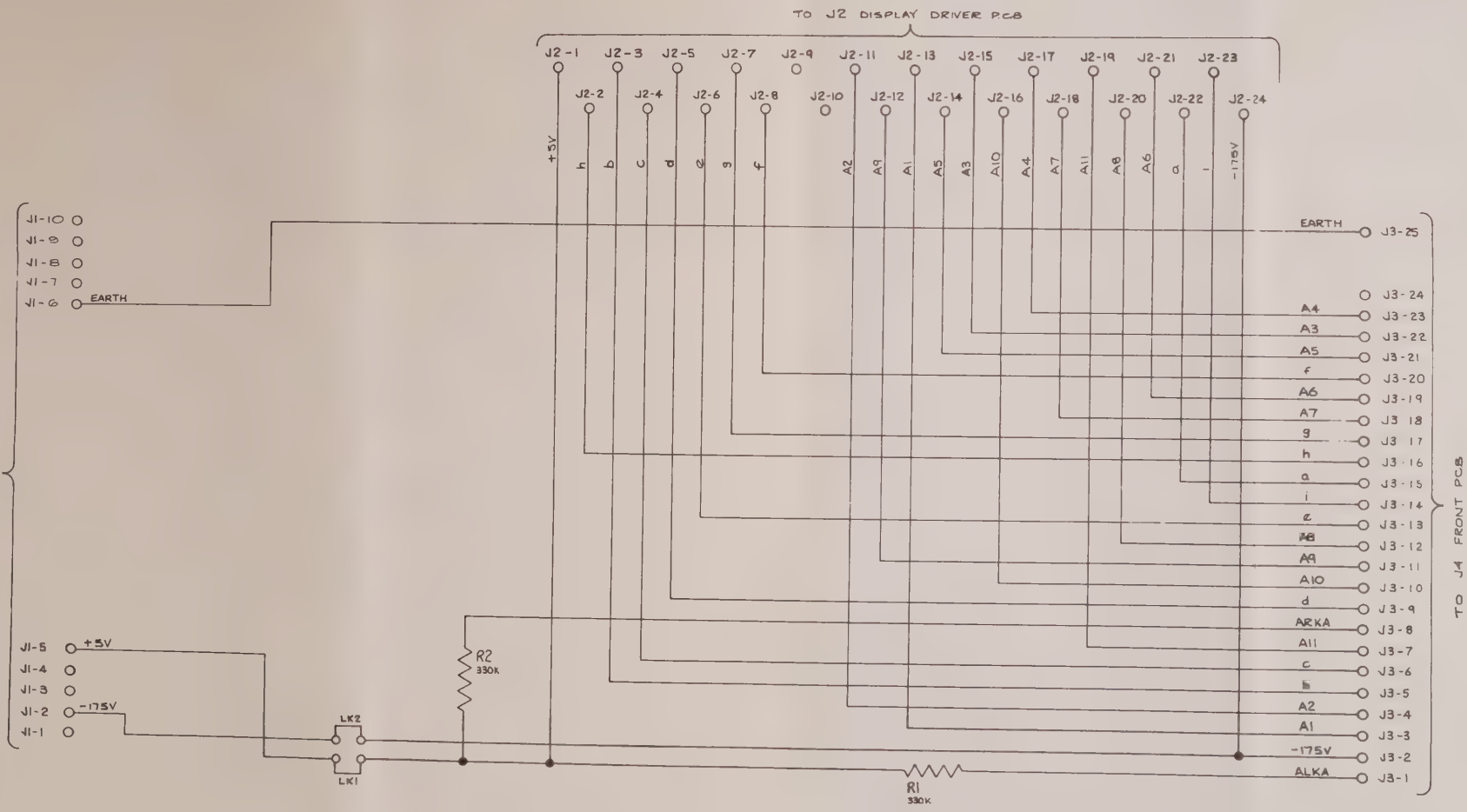
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
D	
1C	RELEASED TO PROD 20-5-78
2	DIG COM SCREEN REMOVED BJ ECO 880 9-5-79



DRAWN B.J.	CHECKED D.J.	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ½° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ∓ 4mm UNLESS OTHERWISE STATED	MATERIAL	datron ELECTRONICS LTD. NORWICH.
TRACED	APPROVED	SCALE NOT TO BE SCALED		FINISH	TITLE R.H. SIDE P.C.B. SCHEMATIC.
DATE 26-5-78	DATE				DRAWING No. 430298

DRAWING SIZE A2

SHEET 1 OF 1

DRAWING No. 400306
FIRST USED ON 1061/127.

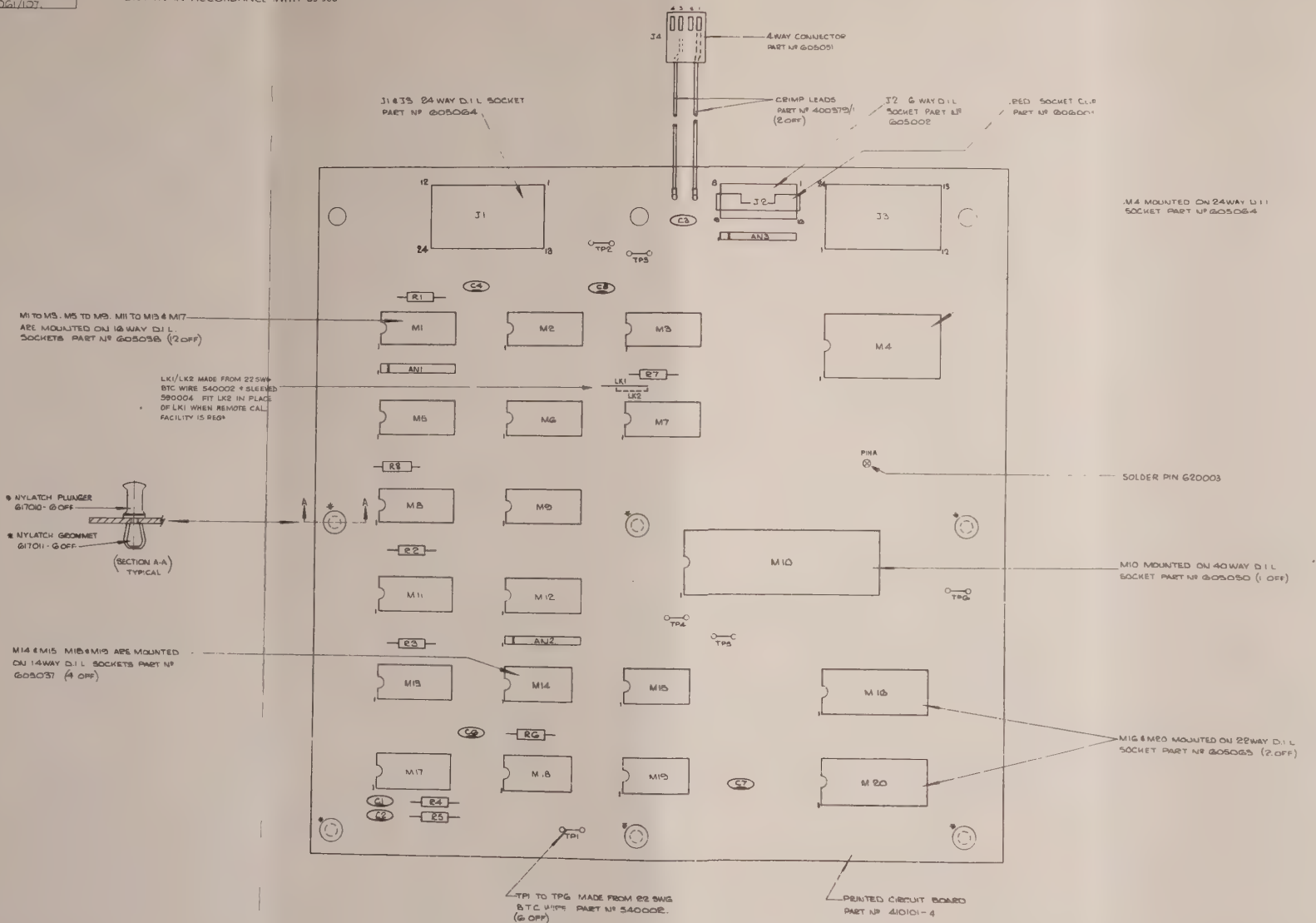
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
1	DELEATED TO PRODUCTION IB WAY TO W.G.S.
2	ECO 1008 76-10-79 R8 ADDED W.G.S.
3	ECO 1000 1058 SOCKET CLIP FOR J2 WAS 606007 PIN A + LK1/LK2 ADDED 18.1.80


J4
4 WAY CONNECTOR PART Nº 605051
J1 & J3 24 WAY D.I.L SOCKET PART Nº 605064
CRIMP LEADS PART Nº 400379/1 (2 OFF)
J2 6 WAY D.I.L SOCKET PART Nº 605002
RED SOCKET CLIP PART Nº 606007
M4 MOUNTED ON 24 WAY D.I.L SOCKET PART Nº 605064
M1 TO M3, M5 TO M9, M11 TO M13 & M17 ARE MOUNTED ON 16 WAY D.I.L. SOCKETS PART Nº 605036 (12 OFF)
LK1/LK2 MADE FROM 22 SWG BTC WIRE 540002 + SLEEVED 580004 FIT LK2 IN PLACE OF LK1 WHEN REMOTE CAL. FACILITY IS REQ'D
PIN A
SOLDER PIN 620003
* NYLATCH PLUNGER 617010 - 6 OFF
* NYLATCH GROMMET 617011 - 6 OFF
(SECTION A-A TYPICAL)
M10 MOUNTED ON 40 WAY D.I.L SOCKET PART Nº 605050 (1 OFF)
M14 & M15 M18 & M19 ARE MOUNTED ON 14 WAY D.I.L SOCKETS PART Nº 605037 (4 OFF)
M16 & M20 MOUNTED ON 22 WAY D.I.L SOCKET PART Nº 605053 (2 OFF)
TP1 TO TP6 MADE FROM 22 SWG B.T.C. WIRE PART Nº 540002. (6 OFF)
PRINTED CIRCUIT BOARD PART Nº 410101-4

CIRCUIT DIAGRAM = 430306-3

DRAWN W G Smith	CHECKED C.G. APPROVED	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± .1mm DECIMAL TO 1 PLACE ± .2mm WHOLE DIMENSIONS ± 1mm UNLESS OTHERWISE STATED	ANGULAR ° ±	MATERIAL
DATE 26th APRIL 78	DATE 18-MAY 79	SCALE NOT TO BE SCALED			FINISH

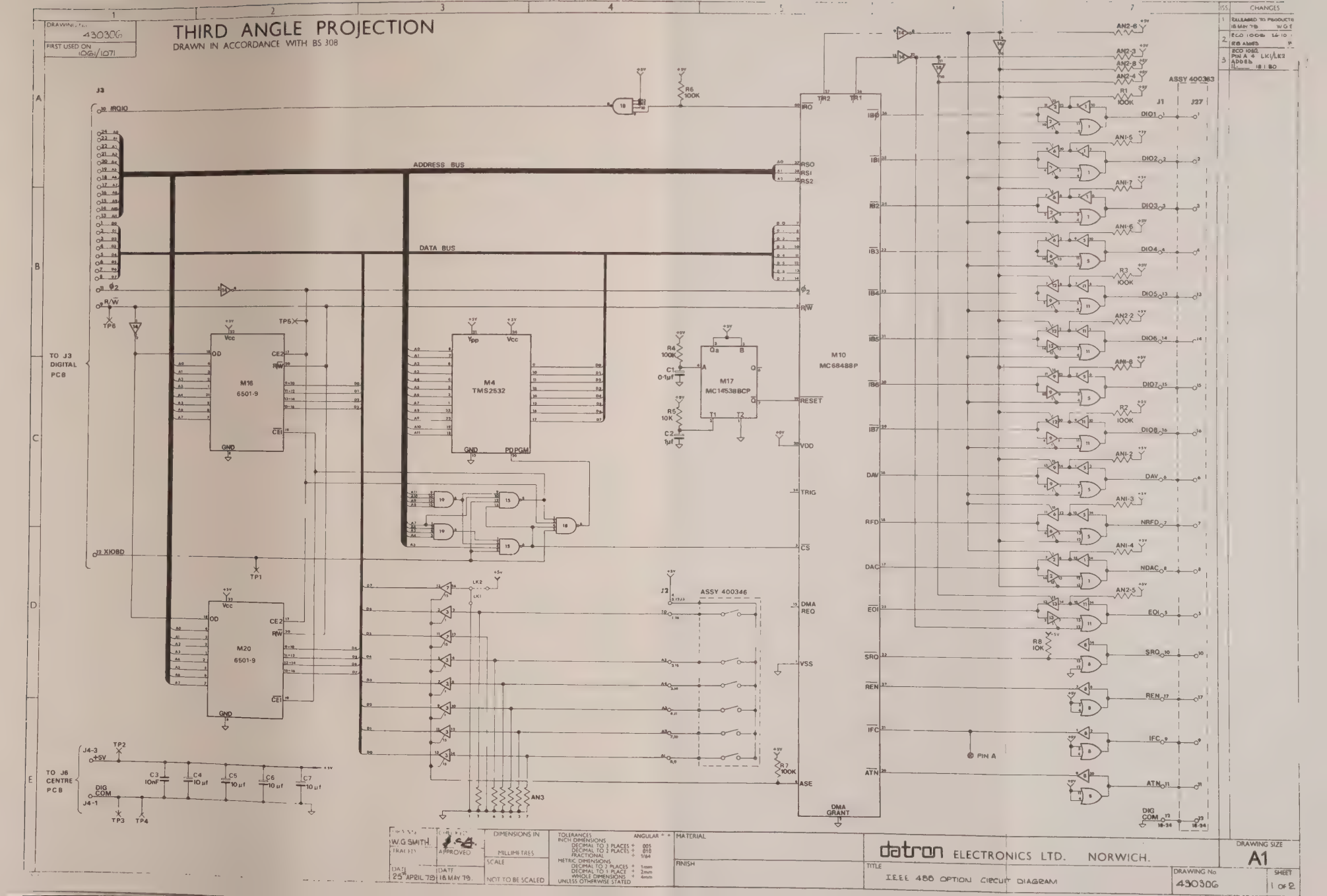
datron ELECTRONICS LTD. NORWICH.

TITLE IEEE 488 OPTION P.C.B. ASSEMBLY (400306)

DRAWING SIZE A1

DRAWING No

SHEET


THIRD ANGLE PROJECTION
DRAWN IN ACCORDANCE WITH BS 308
DRAWING No 430306
FIRST USED ON 1061/1071
ISS CHANGES
1 RELABELLED TO PRODUCTS 15 MAY 79 W G S
ECO 1008 16-10-
2 IEEE ADDED P
ECO 1052 PIN A 4 LK1/LK2 ADDED IL 18 I 80
ASSY 400363
J3
IRQIO
ADDRESS BUS
DATA BUS
R/W
TP6
TO J3 DIGITAL PCB
M16 6501-9
M20 6501-9
M4 TMS2532
M17 MC14538BCP
M10 MC68488P
R4 100K
C1 0·1µf
R5 10K
C2 1µf
R6 100K
R7 100K
R8 10K
R1 100K
R2 100K
R3 100K
RESET
VDD
TRIG
CS
DMA REQ
VSS
ASE
DMA GRANT
IRQ
RS0
RS1
RS2
Φ2
RW
IB0
IB1
IB2
IB3
IB4
IB5
IB6
IB7
DAV
RFD
DAC
EOI
SRQ
REN
IFC
ATN
J2 XIOBD
TP1
LK2
LK1
J2
ASSY 400346
AN3
AN2-6
AN2-3
AN2-8
AN2-4
AN1-5
AN1-7
AN1-6
AN2-2
AN1-8
AN1-2
AN1-3
AN1-4
AN2-5
DIO1
DIO2
DIO3
DIO4
DIO5
DIO6
DIO7
DIO8
NDAC
NRFD
EOI
SRQ
REN
IFC
ATN
DIG COM
PIN A
J1
J27
TO J6 CENTRE PCB
J4-3 +5V
J4-1 DIG COM
TP2
TP3
TP4
C3 10nF
C4 10 µf
C5 10 µf
C6 10 µf
C7 10 µf
W.G SMITH
APPROVED
DATE 25 APRIL 79
DATE 18 MAY 79
DIMENSIONS IN MILLIMETRES
SCALE NOT TO BE SCALED
TOLERANCES
INCH DIMENSIONS
DECIMAL TO 3 PLACES ± .005
DECIMAL TO 2 PLACES ± .010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 2 PLACES ± 1mm
DECIMAL TO 1 PLACE ± 2mm
WHOLE DIMENSIONS ± 4mm
UNLESS OTHERWISE STATED
ANGULAR ± °
MATERIAL
FINISH
datron ELECTRONICS LTD. NORWICH.
TITLE IEEE 488 OPTION CIRCUIT DIAGRAM
DRAWING SIZE A1
DRAWING No 430306
SHEET 1 OF 2

DRAWING No. 430306

FIRST USED ON 1061/1071

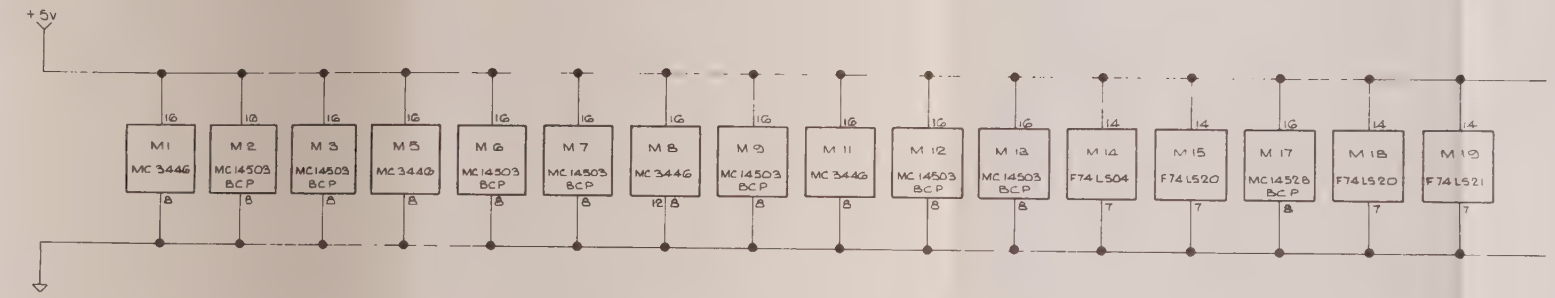
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

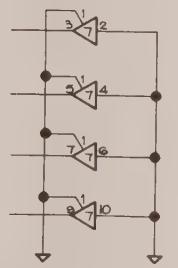
ALL BURRS TO BE REMOVED

NOTES

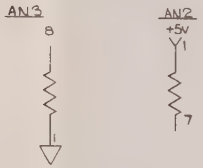
ISS.	CHANGES
A	FIRST ISSUE. 2 MAY 79 W.G.S.
1	RELEASED TO PRODUCTION 18 MAY 79. W.G.S.
2	ECO 1008 BJ. R8 ADDED 26-10-79
3	SEE SHEET 1



UNUSED GATES M7



UNUSED RES. NETWORKS



DRAWN W.G.SMITH.	CHECKED S.C.M.	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ½° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A2
TRACED	APPROVED			FINISH	TITLE I.EEE 488 OPTION CIRCUIT DIAGRAM	DRAWING No. 430306
DATE 25 APRIL 79.	DATE 18 MAY 79.	SCALE NOT TO BE SCALED				SHEET 2 of 2

DRAWING No. 400330

FIRST USED ON

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

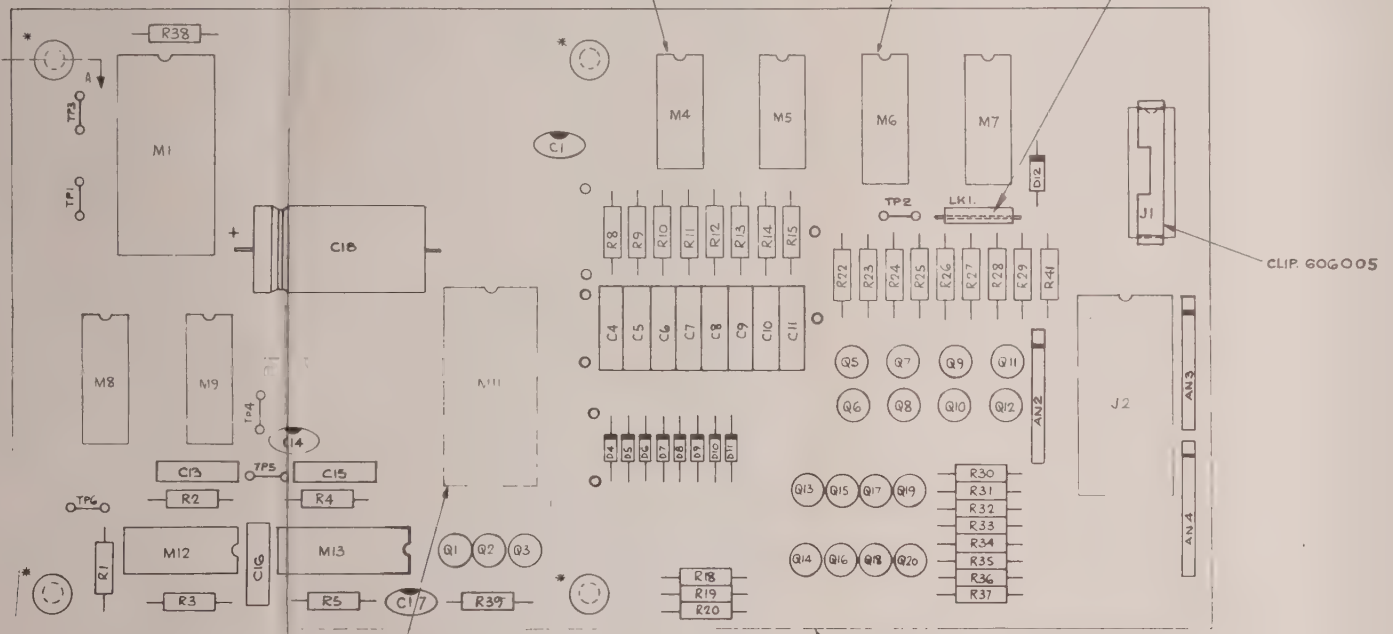
NOTES

1 MAKE TP1-TP6 FROM 22 SWG BTC WIRE - PART Nº 540002

* NYLATCH - GROMMET 617011 - 4 OFF

* NYLATCH - PLUNGER 617010 - 4 OFF N.B. FIT FROM COMPONENT SIDE OF PCB.

SECTION A-A

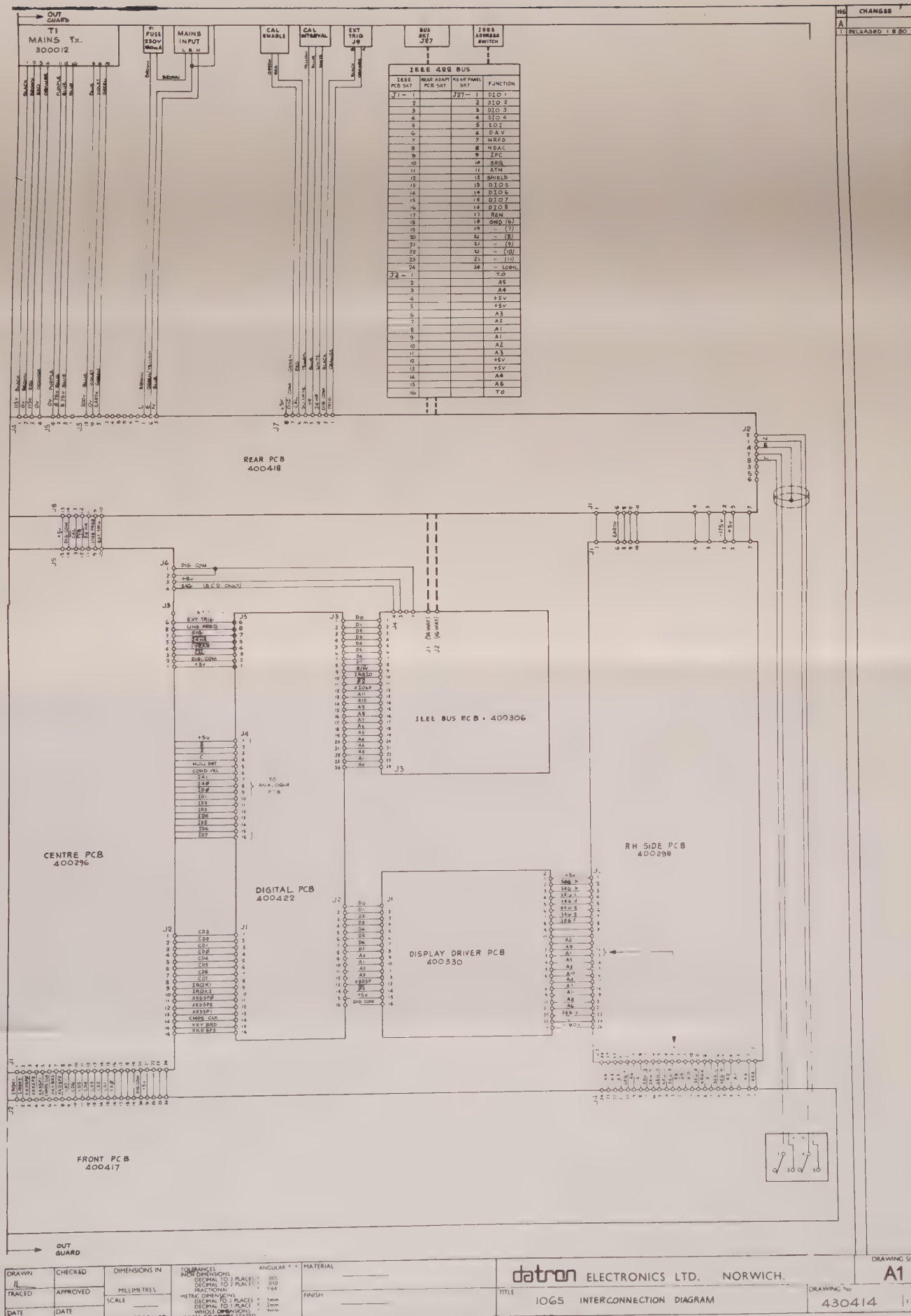


MOUNT M11 & M11 ON 24 WAY SOCKETS 605064 - 2 OFF

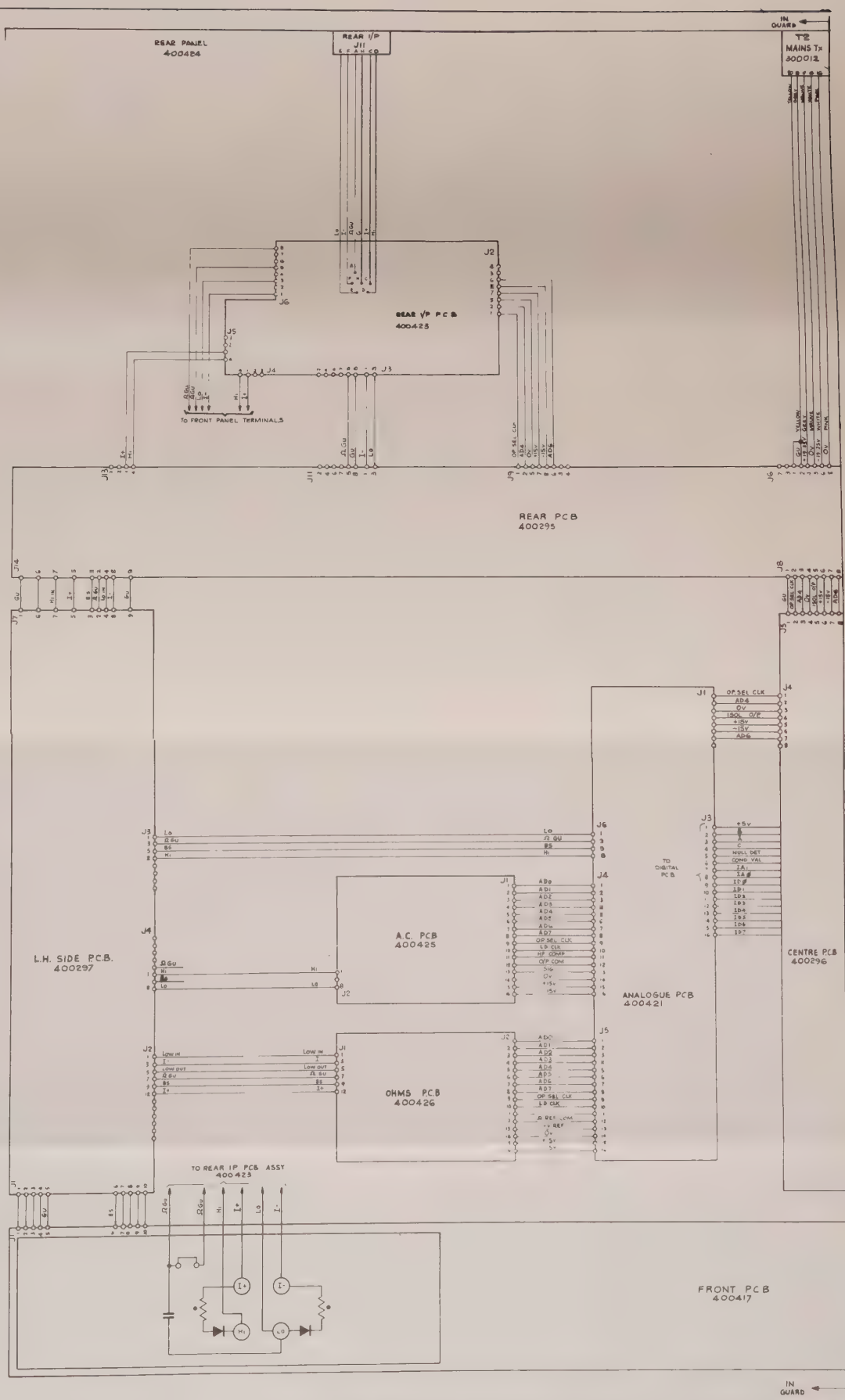
PCB 410047-5A

REV	
C	
1	
2	C18 ADDED ECO 1859. 17 NOV 78. W.G.S.
3	R42-R44 ADDED R41 & D12 ADDED ECO 882 20-FEB 79 W.G.S.
4	R40 WAS 180R, DIODE D12 WAS 1N4148 ECO 884 10 MAY 79 W.G.S.
5	CLIP FOR J1 WAS 60G005. ECO 9004 26.6.79 IL
6	ECO 10004 1025. RIBBON CABLE CLIP WAS 60G007, D12 WAS BZY

DRAWN IL	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES: INCH DIMENSIONS DECIMAL TO 2 PLACES ± .01 DECIMAL TO 1 PLACE ± .02 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL SEE PARTS LIST	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A2	
TRACED	APPROVED						
DATE 3.5.78	DATE	SCALE 2:1 NOT TO BE SCALED		FINISH —	TITLE 1061 DISPLAY DRIVER PCB ASSY.	DRAWING No. 400330	SHEET 1 of 7


OUT GUARD
T1 MAINS Tx. 300012
FUSE 230V 100mA
MAINS INPUT L E N
CAL ENABLE
CAL INTERVAL
EXT TRIG J9
BUS SKT J27
IEEE ADDRESS SWITCH
IEEE 488 BUS
IEEE PCB SKT | REAR ADAPT PCB SKT | REAR PANEL SKT | FUNCTION
J1 - 1 | J27 - 1 | DIO 1
2 | 2 | DIO 2
3 | 3 | DIO 3
4 | 4 | DIO 4
5 | 5 | EOI
6 | 6 | DAV
7 | 7 | NRFD
8 | 8 | NDAC
9 | 9 | IFC
10 | 10 | SRQ
11 | 11 | ATN
12 | 12 | SHIELD
13 | 13 | DIO 5
14 | 14 | DIO 6
15 | 15 | DIO 7
16 | 16 | DIO 8
17 | 17 | REN
18 | 18 | GND (6)
19 | 19 | " (7)
20 | 20 | " (8)
21 | 21 | " (9)
22 | 22 | " (10)
23 | 23 | " (11)
24 | 24 | " LOGIC
J2 - 1 | | | TO
2 | | | A5
3 | | | A4
4 | | | +5V
5 | | | +5V
6 | | | A3
7 | | | A2
8 | | | A1
9 | | | A1
10 | | | A2
11 | | | A3
12 | | | +5V
13 | | | +5V
14 | | | A4
15 | | | A5
16 | | | TO
REAR PCB 400418
IEEE BUS PCB - 400306
CENTRE PCB 400296
DIGITAL PCB 400422
DISPLAY DRIVER PCB 400330
RH SIDE PCB 400298
FRONT PCB 400417
OUT GUARD
CHANGES
A RELEASED 1 8 80
DRAWN
TRACED
CHECKED
APPROVED
DATE 12 6 80
DIMENSIONS IN MILLIMETRES
SCALE
NOT TO BE SCALED
TOLERANCES UNLESS OTHERWISE STATED
MATERIAL
FINISH
datron ELECTRONICS LTD. NORWICH.
TITLE 1065 INTERCONNECTION DIAGRAM
DRAWING SIZE A1
DRAWING NO 430414
SHEET 1 OF 3

430414



datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A

1065 INTERCONNECTION DIAGRAM

DRAWING No. 430414

SHEET 2

DRAWING No 400417
FIRST USED ON 1065

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

IMPORTANT.

1. FIT M1 3 4 5 6 8 9 11 INTO 16 WAY AUGAT SOCKET PART NO 605061
   FIT M7 & M10 INTO AUGAT SOCKET PART NO 605062 18 WAY.
   FIT M2 INTO AUGAT SOCKET PART No. 605060. 14 WAY
2. TO REMOVE DISPLAY:-
   CUT PINS HERE
   DISPLAY TAPE PCB
   THIN STEEL RULE
   SLIDE THIN STEEL RULE BETWEEN DISPLAY & PCB TO SPLIT FOAM TAPE

	CHANGES
A	
B	R14 ADDED 24.7.80 IL
1	RELEASED 1.8.80
2	ECO 1157 LIGHT SENSITIVE DIODES D1 & D2 SLEEVED IL 22.9.80

P.C.B. TERMINAL PLATE

SOLDER TAG NOT TO BE FITTED EXCEPT ON M3 SCREW & BLACK TERMINAL THE REST TO BE RETURNED TO STORES UNDER PART Nº 613005

ASSEMBLE 4 TERMINALS TO TERMINAL PLATE (PART Nº 450179) AND P.C.B AS SHOWN ABOVE. TERMINAL COLOURS MUST BE AS INDICATED BELOW.

NOTE
NO COMPONENTS TO STAND HIGHER THAN 7.5 mm (EXCEPT SWITCH'S & TERMINALS)
EXCEPT Q4 & Q5 WHICH MUST BE LESS THAN 6.5 mm

7.5 mm MAX

SLEEVE LEADS OF C9 WITH HEATSHRINK Ø 4.8 590032 & SOLDER TO TAGS ON M3 SCREW & BLACK TERMINAL

M3 x 10mm SCREW G11006 1 OFF
M3 FLAT WASHER G13007 2 OFF
M3 NUT G15002 2 OFF

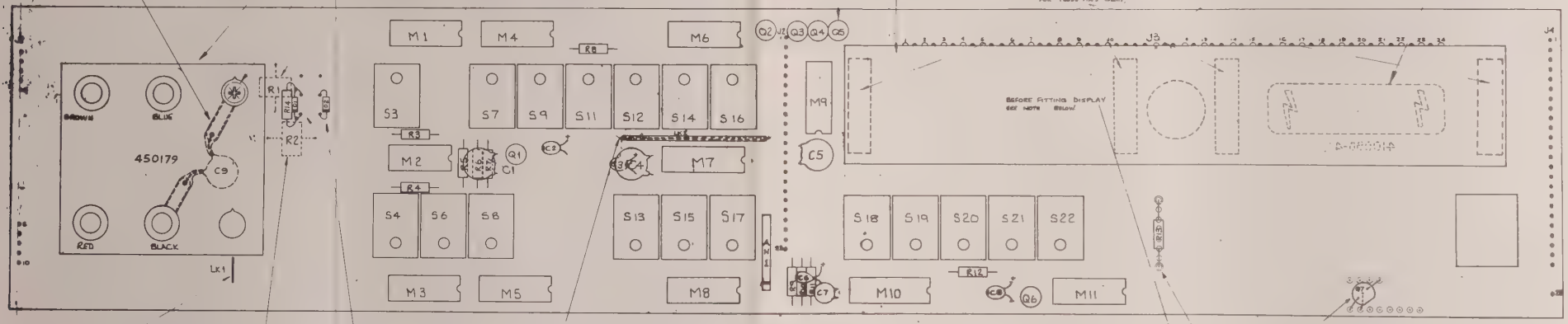
RESISTORS R1 & R2 (SHOWN BY DOTTED LINES) TO BE MOUNTED ON UNDERSIDE OF BOARD

8½ DIGIT DISPLAY (DATRON PART No 800017)

DISPLAY TO HAVE 4 PIECES (25mm LONG) OF PRESSURE SENSITIVE TAPE PART Nº G30025 STUCK TO REVERSE OF DISPLAY IN POSITIONS SHOWN
LINE UP & PRESS DISPLAY FIRMLY INTO PLACE THEN SOLDER THE 24 PINS ONLY WHICH ARE SHOWN BELOW. (THERE ARE SOLDER PADS FOR THESE PINS ONLY)

FIT WARNING LABEL 420080-1 IN APPROX POSITION SHOWN ON TRACK SIDE OF PCB NEAR MAINS AND DISPLAY CONNECTIONS

FRONT P.C.B 410090-4P



ALL LINKS USE 22 SWG TIN COPPER WIRE PART No 540002

N.B SLEEVE BODY OF D1 & D2 (LIGHT SENSITIVE !) WITH SLEEVE 590001 — 2 OFF BEFORE SOLDERING.

LINK WIRE 22 SWG TIN Cu WIRE 540008. SLEEVE WITH 590004.

ALL CAPACITORS TO BE LAID DOWN WHERE POSSIBLE, AS SHOWN. LEADS TO BE BENT AT RIGHT ANGLES THEN INSERTED INTO BOARD. THIS IS TO KEEP CAPACITORS AS LOW AS POSSIBLE

SLEEVE LEADS USING 590004 BEFORE SOLDERING Q7 TO PCB

BEFORE SOLDERING R13 TO PCB, MOUNT RESISTOR ON BEADS G30036 2 OFF

RESISTORS R1 & R2. 2 OFF INSULATING BEADS — (PART No 630024) ASSEMBLED ON EACH LEG (AS SHOWN).

PINS OF THE DISPLAY MUST BE CUT ALONG THE LINE SHOWN, EX THEN THE PINS MUST BE BENT FROM A TO B BEFORE INSERTION INTO PCB

A B 90°

DRAWN IL	CHECKED MJS	DIMENSIONS IN MILLIMETRES	TOLERANCES LIGHT DIMENSIONS DECIMAL TO 3 PLACES ± 0.005 DECIMAL TO 2 PLACES ± 0.01 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 1 PLACE ± 0.1 DECIMAL TO 2 PLACES ± 0.05 WHOLE NUMBERS ± 0.5 UNLESS OTHERWISE STATED	ANGULAR ± 1°	MATERIAL
TRACED	APPROVED	SCALE 2:1 NOT TO BE SCALED			FINISH
DATE 21.5.80	DATE				

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A1

TITLE FRONT P.C.B. ASSY. 1065

DRAWING No. 400417

SHEET 1 OF 6

DRAWING No 430417
FIRST USED ON 1065

THIRD ANGLE PROJECTION

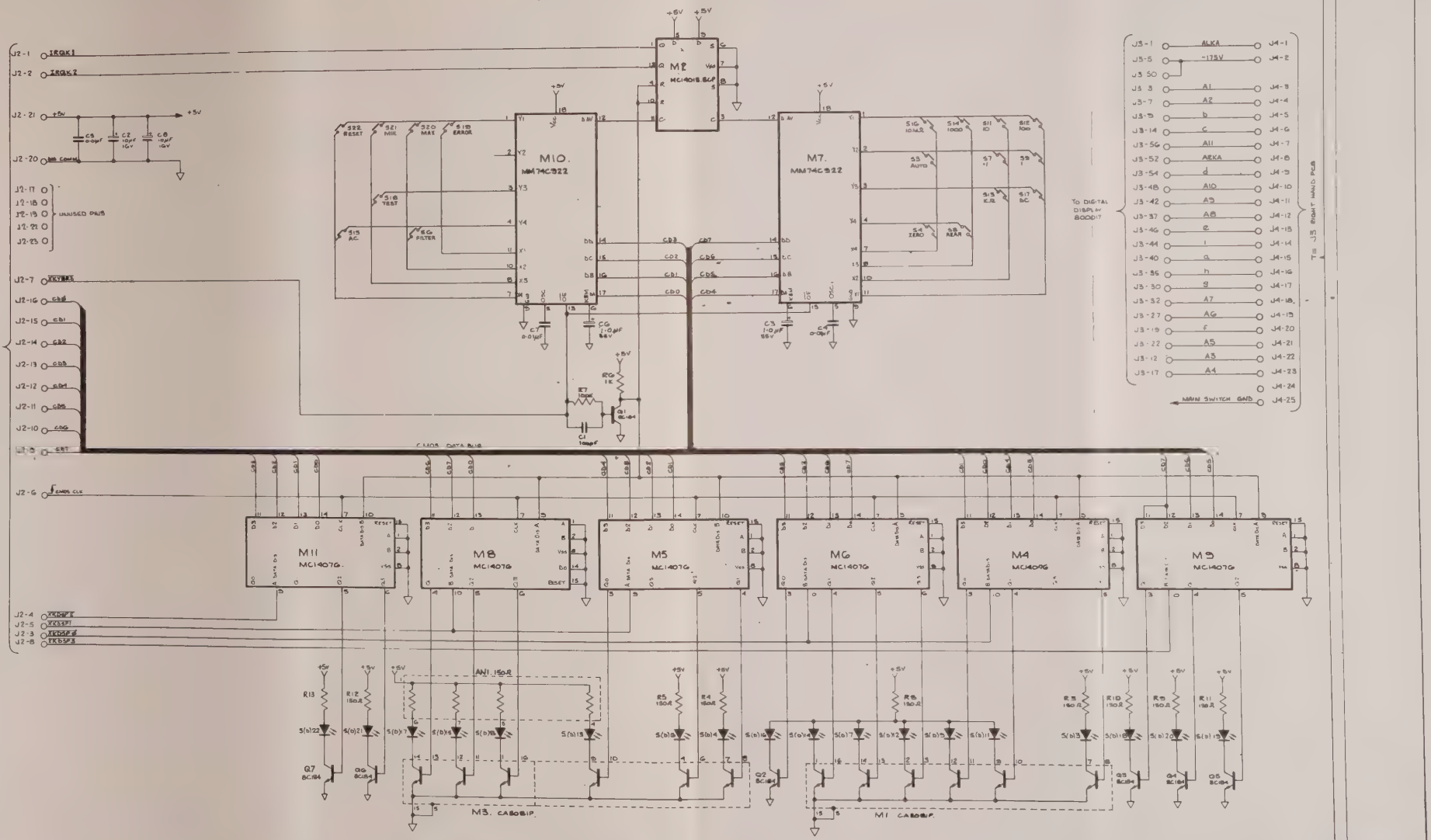
DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1. SIGNAL CDI ON J2-18, THERE IS A LINK LIKE IN THIS SIGNAL LINE

CHANGES	
B	SEE SHT 2
I	RELEASED 1 8 80



DRAWN IL	CHECKED MSD	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 ANGULAR ± ° METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
TRACED	APPROVED	SCALE — NOT TO BE SCALED		FINISH	TITLE FRONT PCB CIRCUIT DIAGRAM 1065	DRAWING No 430417 SHEET 1 OF 2
DATE 21 5 80	DATE					

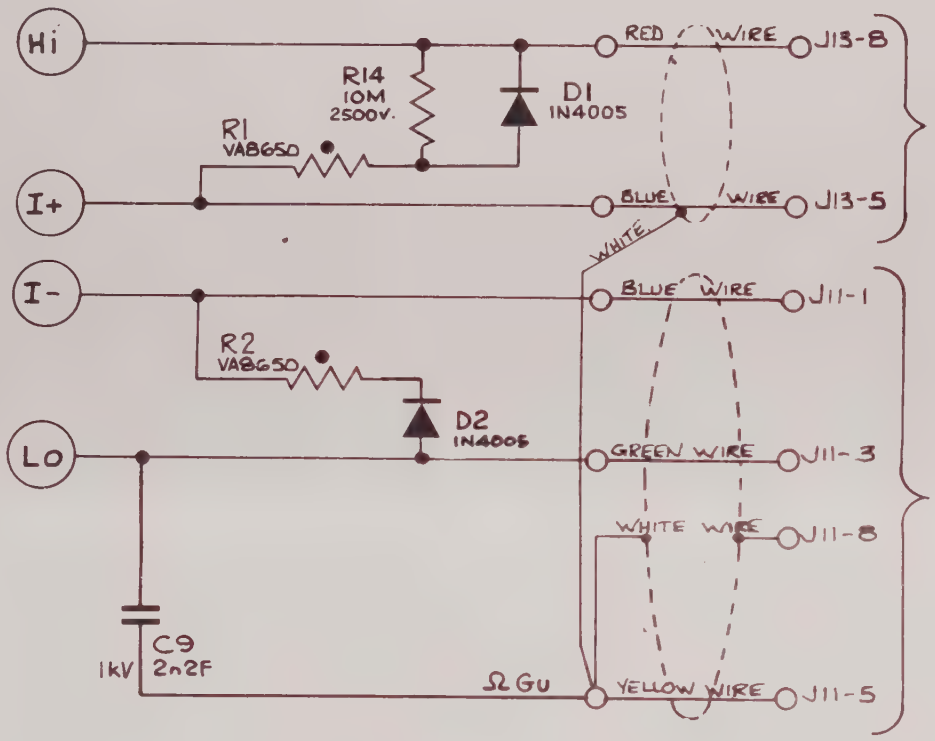
430417

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH B.S. 308

ALL BURRS TO BE REMOVED

ISS.	CHANGES
A	
B	R14 ADDED 24.7.80 IL.
1	RELEASED 1/8/80



NOTES:

1/ G(J1-5) SCREENS ALL CIRCUITRY ON THIS SHEET.

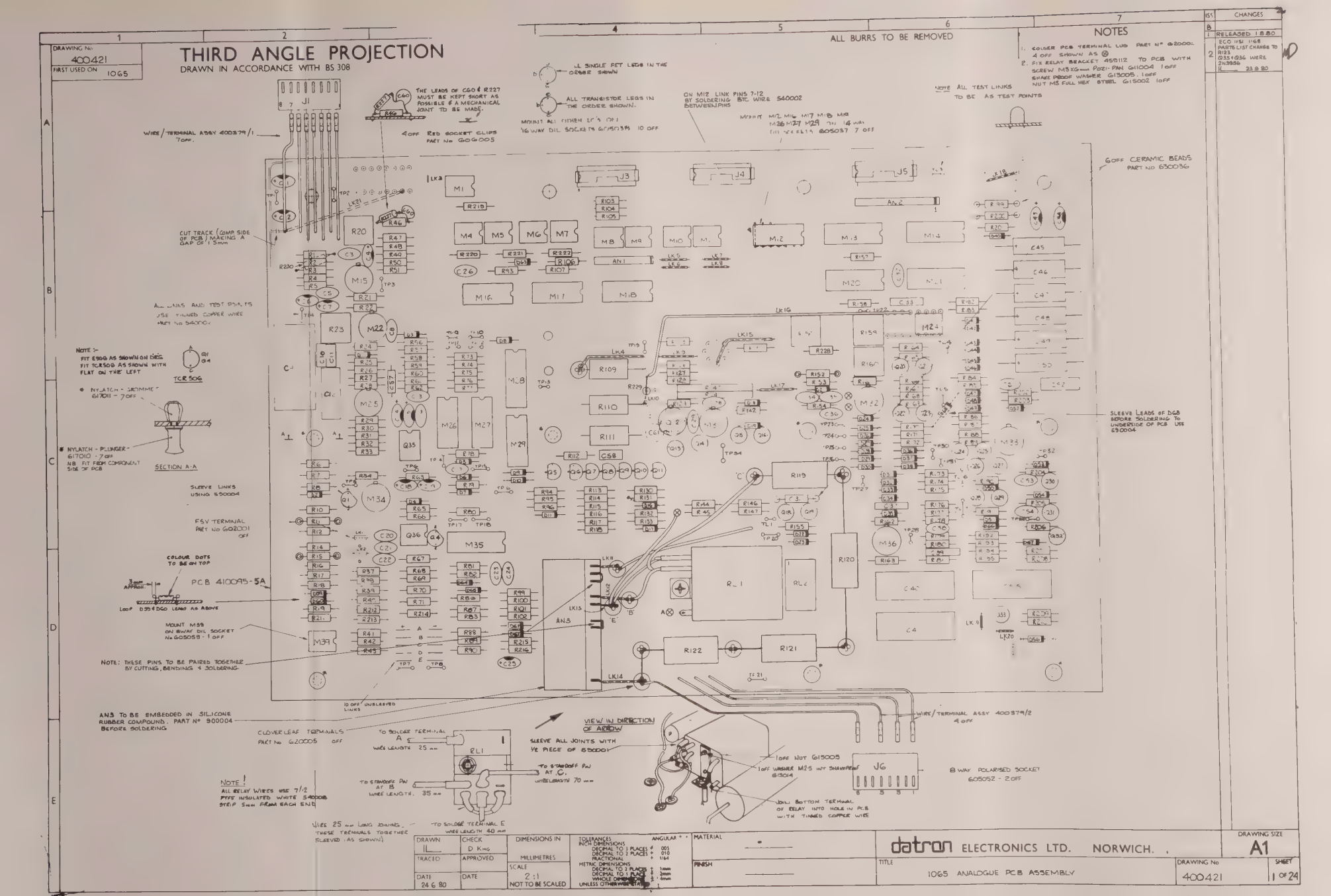
2/ B.S. SCREENS Hi & I+.

3/ Ω GU SCREENS Lo & I-

DRAWN IL	DATE 21.5.80	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ½° DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL —	datron ELECTRONICS LTD. NORWICH		DRAWING SIZE A4
CHKD MRD	DATE 13.6.80	SCALE — NOT TO BE SCALED		FINISH —	TITLE 1065 FRONT PCB CIRCUIT DIAG.	DRAWING No. 430417	SHEET 2 OF 2
APPD	DATE						

J.W. 1786

4961HT


THIRD ANGLE PROJECTION
DRAWN IN ACCORDANCE WITH BS 308
DRAWING No 400421
FIRST USED ON 1065
ALL BURRS TO BE REMOVED
NOTES
1. SOLDER PCB TERMINAL LUG PART Nº G2000L 4 OFF SHOWN AS ⊗
2. FIX RELAY BRACKET 458112 TO PCB WITH SCREW M3 X 6mm POZI-PAN G11004 1 OFF SHAKE PROOF WASHER G13005 1 OFF NUT M3 FULL HEX STEEL G15002 1 OFF
NOTE ALL TEST LINKS TO BE AS TEST POINTS
ALL SINGLE FET LEGS IN THE ORDER SHOWN
ALL TRANSISTOR LEGS IN THE ORDER SHOWN.
MOUNT ALL FITMENT IC'S ON 16 WAY DIL SOCKETS G05039 10 OFF
ON M12 LINK PINS 7-12 BY SOLDERING BTC WIRE 540002
MOUNT M12 M16 M17 M18 M19 M26 M27 M29 ON 14 WAY DIL SOCKETS 605037 7 OFF
THE LEADS OF C60 & R227 MUST BE KEPT SHORT AS POSSIBLE & A MECHANICAL JOINT TO BE MADE.
4 OFF RED SOCKET CLIPS PART No G06005
WIRE/TERMINAL ASSY 400379/1 7 OFF.
CUT TRACK (COMP SIDE OF PCB) MAKING A GAP OF 1.5mm
ALL LINKS AND TEST POINTS USE TINNED COPPER WIRE PART No 540001
NOTE :- FIT BC500 AS SHOWN ON DIAG. FIT TCR500 AS SHOWN WITH FLAT ON THE LEFT
TCR 506
* NYLATCH - PLUNGER - 617010 - 7 off
NB FIT FROM COMPONENT SIDE OF PCB
SECTION A-A
SLEEVE LINKS USING 530004
FSV TERMINAL PART No G02001 9 off
COLOUR DOTS TO BE ON TOP
PCB 410095-5A
Loop D354 DGG LEAD AS ABOVE
MOUNT M39 ON 8WAY DIL SOCKET No G05059 - 1 off
NOTE: THESE PINS TO BE PAIRED TOGETHER BY CUTTING, BENDING & SOLDERING
6 OFF CERAMIC BEADS PART NO 650036
SLEEVE LEADS OF DGB BEFORE SOLDERING TO UNDERSIDE OF PCB USE 530004
AN3 TO BE EMBEDDED IN SILICONE RUBBER COMPOUND. PART Nº 900004 BEFORE SOLDERING
10 OFF UNSLEEVED LINKS
CLOVERLEAF TERMINALS PART No G20005 9 OFF
TO SOLDER TERMINAL A WIRE LENGTH 25 mm
TO SOLDER TERMINAL E WIRE LENGTH 40 mm
TO STANDOFF PIN B WIRE LENGTH 35 mm
TO STANDOFF PIN A.C. WIRE LENGTH 70 mm
NOTE ! ALL RELAY WIRES USE 7/2 PVC INSULATED WHITE 540008 STRIP 5mm FROM EACH END
WIRE 25 mm LONG JOINING THESE TERMINALS TOGETHER SLEEVED (AS SHOWN)
VIEW IN DIRECTION OF ARROW
SLEEVE ALL JOINTS WITH V6 PIECE OF 530001
1 OFF NUT G15005
1 OFF WASHER M3 S INT SHAKEPROOF 613014
DRILL BOTTOM TERMINAL OF RELAY INTO HOLE IN PCB WITH TINNED COPPER WIRE
WIRE/TERMINAL ASSY 400379/2 4 OFF
8 WAY POLARISED SOCKET 605052 - 2 OFF
ISS CHANGES
B
1 RELEASED 18 80
2 ECO 1151 1168 PARTS LIST CHANGE TO R123 Q33 + Q36 WERE 2N3906 IL 23 9 80
DRAWN IL
CHECK D King
TRACED
APPROVED
DATE 24 6 80
DATE
DIMENSIONS IN MILLIMETRES
SCALE 2:1 NOT TO BE SCALED
TOLERANCES UNLESS OTHERWISE STATED
ANGULAR + °
MATERIAL
FINISH
datron ELECTRONICS LTD. NORWICH.
TITLE 1065 ANALOGUE PCB ASSEMBLY
DRAWING No 400421
DRAWING SIZE A1
SHEET 1 OF 24

DRAWING No 430421
FIRST USED ON 1065

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

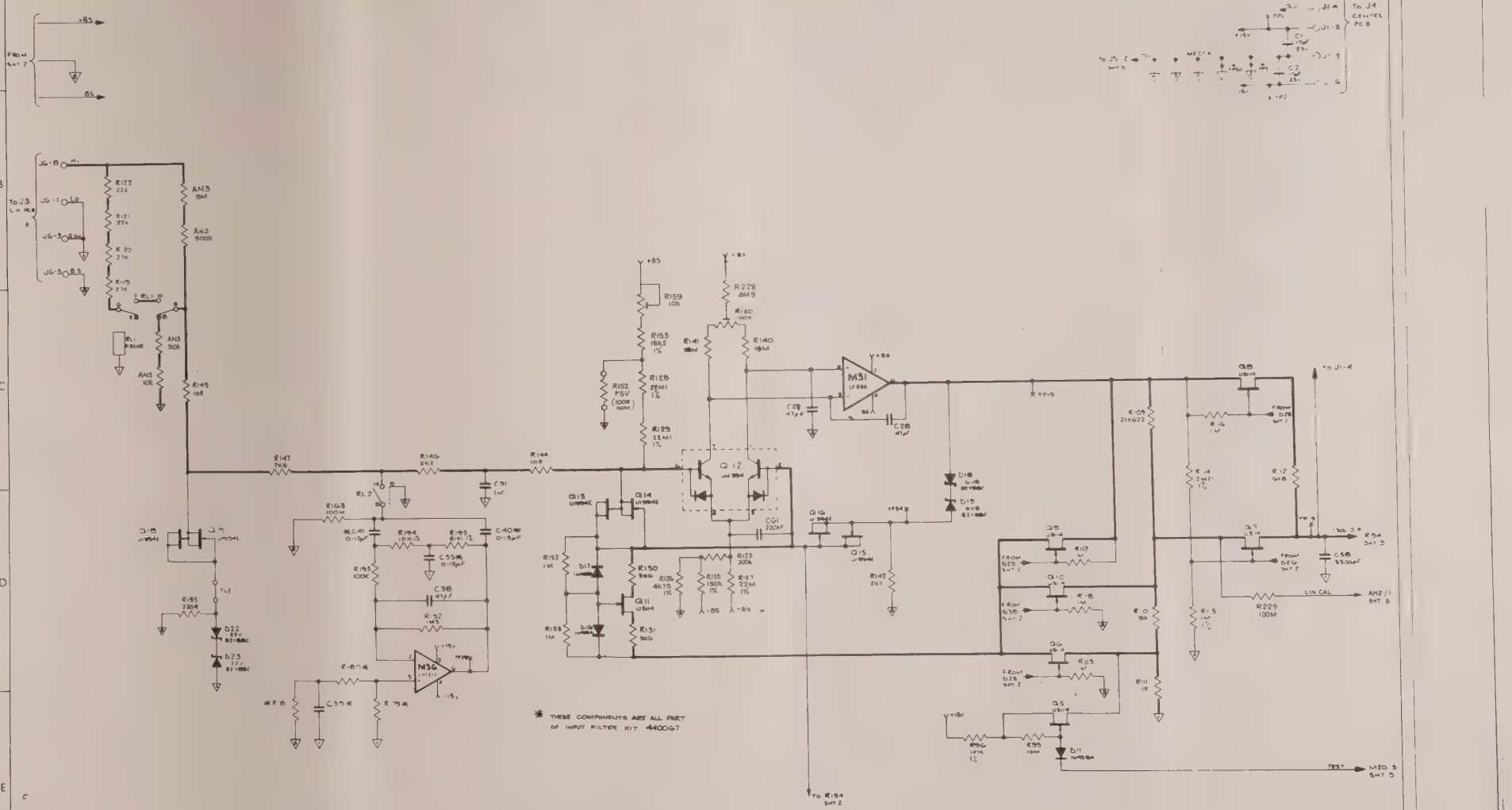
ALL BURRS TO BE REMOVED

NOTES

: SIGNAL COMMONS

: ANALOGUE COMMON

ISS	CHANGES
A	
1	RELEASED 1.8.80
2	ECO 1151, 1186 R123 WAS 380K SEE ALSO SHEET 3 23.9.80



DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES UNLESS OTHERWISE STATED: ANGULAR ±°; DECIMAL TO 1 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; DECIMAL TO 1 PLACE ± 1mm; DECIMAL TO 1 PLACE ± 2mm; SMALL DIMENSIONS ± 4mm	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
TRACED	APPROVED	MILLIMETRES				
DATE 24.6.80	DATE	SCALE NOT TO BE SCALED		FINISH	TITLE D.C. ISOLATOR 1065	DRAWING No 430421 SHEET 1 OF 3

DRAWING No. 430421

FIRST USED ON 1065

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

ISS.	CHANGES
A	
1	RELEASED 1 8 80
2	SEE SHEETS 1 4 3

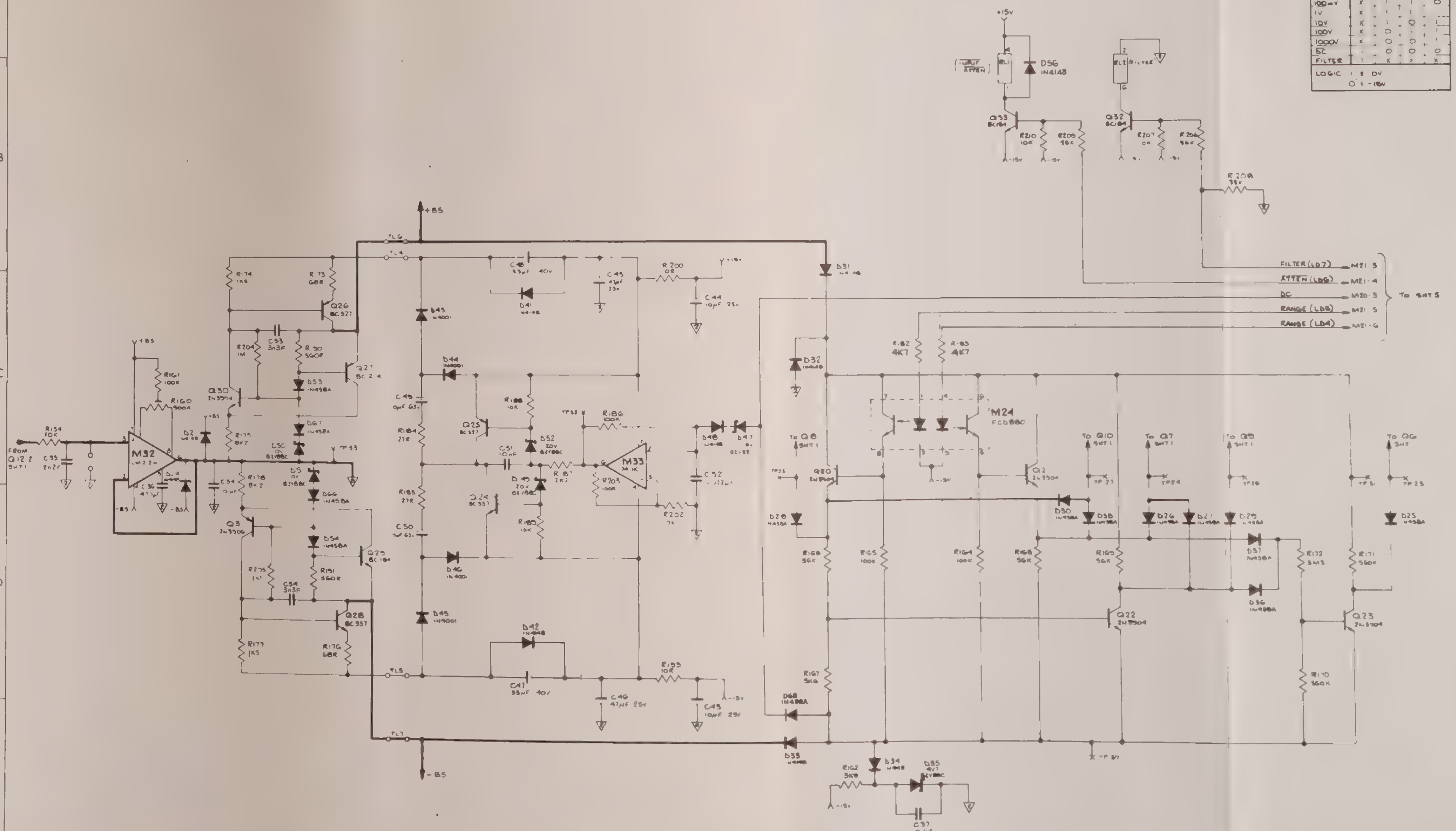
NOTES

RANGE	FET CONTROL LINE TP 23	TP 24	TP 25	TP 26	TP 27
100mV	1	0	1	0	0
1V	0	0	[illegible]	0	[illegible]
10V	0	1	0	1	0
100V	0	0	1	0	1
1000V	0	1	0	1	0
DC	0	0	0	[illegible]	0

LOGIC 1 = FET ON
 0 = FET OFF

RANGE	INPUT CONTROL LINE LD7	LD6	LD5	LD4
100mV	X	1	1	0
1V	X	1	1	[illegible]
10V	X	1	0	1
100V	X	0	1	1
1000V	X	0	0	1
DC	1	0	0	0
FILTER	1	X	X	X

LOGIC 1 = 0V
 0 = -15V



+15v
INPUT ATTEN
RL1
D56 IN4148
Q33 BC184
R210 10K
R209 56K
RL2 FILTER
Q32 BC184
R207
R206 56K
R208 33K
FILTER (LD7) M21 3
ATTEN (LD6) M21 4
DC M20 3
RANGE (LD5) M21 5
RANGE (LD4) M21 6
To SHT 5
+BS
TL6
TL4
R174 1K5
R173 68R
Q26 BC327
C48 33µF 40v
D41
C45 47µF 25v
R200 0R
C44 10µF 25v
D31
D43 1N4001
D44 1N4001
R204 1M
C53 3n3F
R190 560R
Q27 BC214
Q30 2N3904
D53 1N458A
R161 100K
R160 500R
R154 10K
FROM Q12 2 SHT 1
C35 2n2F
M32 LM224
D2
R175 8K2
D67 1N458A
D50 BZY88C
TP33
C34
C36 47pF
R178 8K2
D5 BZY88C
D66 1N458A
Q3 2N3906
D54 1N458A
Q29 BC184
R205 1M
C54 3n3F
R191 560R
Q28 BC337
R177 1K5
R176 68R
TL5
TL7
-BS
C49
R184 27R
Q25 BC337
R188 10R
D52 20v BZY88C
C51 10nF
D49 20v BZY88C
R187 2K2
Q24 BC337
R185 27R
R189 10K
C50
D46 1N4001
D45 1N4001
D42 1N4148
C47 33µF 40v
TP32
R186 100K
M33
R203 100K
R202
C46 47µF 25v
R199 10R
C43 10µF 25v
-15v
D48
D47 BZY88
C52
D32
To Q8 SHT 1
TP25
Q20 2N3904
D28 1N458A
R166 56K
R165 100K
R167 5K6
D68 1N458A
D33
R182 4K7
R183 4K7
M24 FCD880
R164 100K
Q21 2N3904
R168 56K
D30 1N458A
D38 1N458A
R162 5K6
D34
D35 4V7 BZY88C
C37 0.1µF
To Q10 SHT 1
TP 27
To Q7 SHT 1
TP24
To Q9 SHT 1
TP26
To Q6 SHT
TP 25
D26
D27
D29
D25 1N458A
D37 1N458A
D36 1N458A
R169 56K
R172 3M3
R171 560K
Q22 2N3904
Q23 2N3904
R170 560K
TP 30

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
JL	D King	MILLIMETRES	INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; ANGULAR ±	
TRACED	APPROVED	SCALE	METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm	FINISH
DATE 24 6 80	DATE	NOT TO BE SCALED	UNLESS OTHERWISE STATED	

datron ELECTRONICS LTD. NORWICH.

TITLE: BOOT STRAPPED SUPPLIES & RANGE LOGIC 1065

DRAWING SIZE A1

DRAWING No 430421

SHEET 2 OF 3

DRAWING No	430421
FIRST USED ON	1065

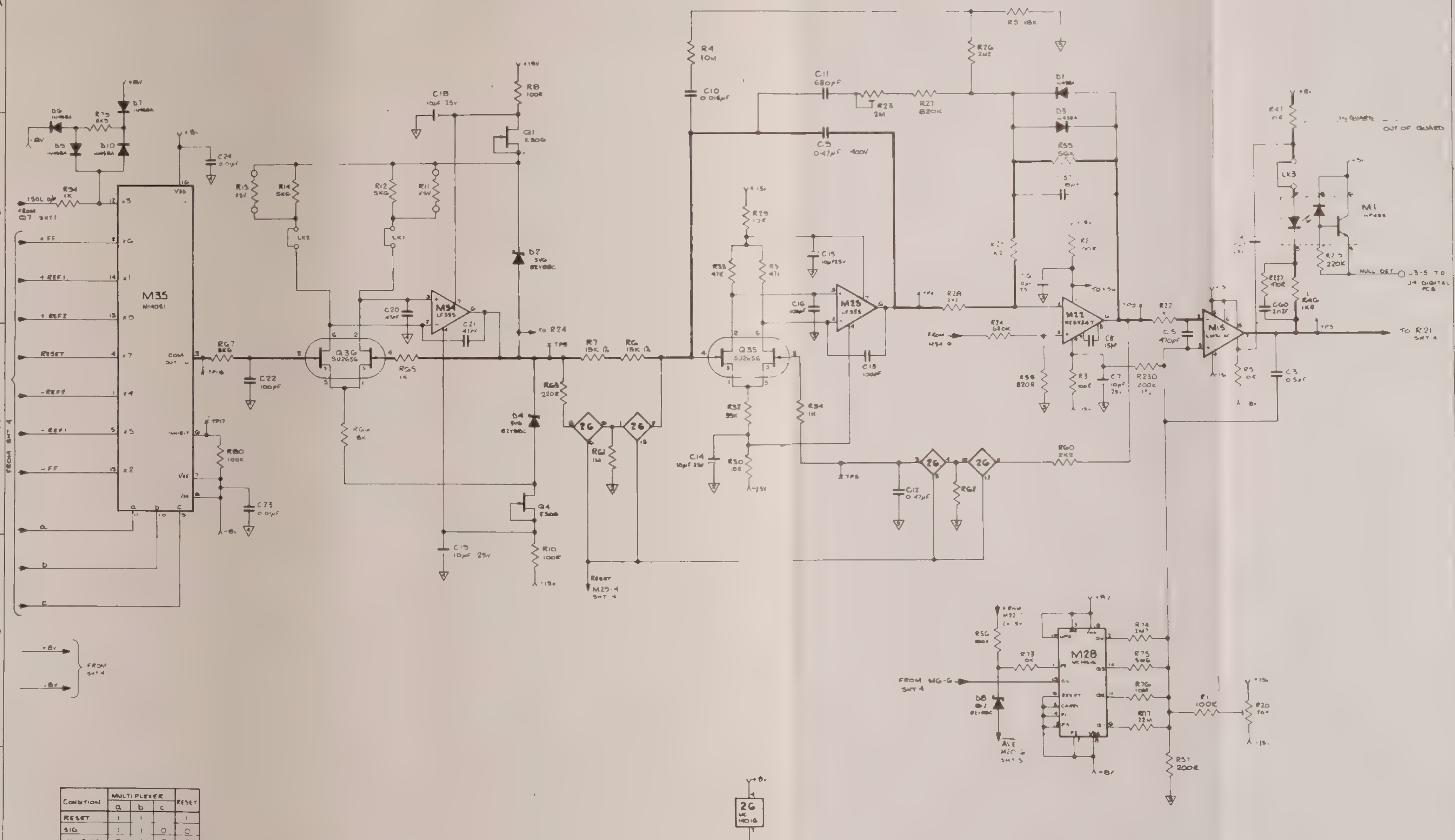
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
A	
1	RELEASED 1 8 80
2	Q35 + Q36 WERE 2N3956



M35
M14051
Q36
SU2656
Q35
SU2656
M34
LF355
M25
LF355
M22
NE5534 T
M15
M28
M1
Q1
E306
Q4
E508
R4 10M
C10 0.015µF
C11 680pF
R23 2M
R27 820K
R26 2M2
R5 18K
C9 0.47µF 400V
R8 100R
C18 10µF 25V
R15
R14 5K6
R12 5K6
R11
LK1
LK2
LK3
D2 5V6 BZY88C
D4 5V6 BZY88C
C20 47pF
C21 47pF
C22 100pF
R67 8K6
R65 1K
R66 8K
R7 15K 1%
R6 15K 1%
R63 220R
R61 1M
R80 100K
C23 0.01µF
C24 0.01µF
R34 1K
C19 10µF 25V
R10 100R
R33 47K
R29 10R
C15 10µF 25V
C16
C13 100pF
R32 35K
R30 10R
C14 10µF 25V
R34 1K
C12 0.47µF
R62
R60 2K2
R28 2K2
R24 680K
R58 820R
R3 100R
R2
C7 10pF 25V
C8 15pF
R230 200K 1%
R22
C5 470pF
C3 0.5pF
R41
R227 470R
C60 1n2F
R46 1K8
R25 220K
IN GUARD
OUT OF GUARD
NULL DET
J3-5 TO J4 DIGITAL PCB
TO R21 SHT 4
TO R24
RESET M25-4 SHT 4
FROM M34 6
FROM M6-6 SHT 4
FROM M22
R56
R73
D8
R74 2M7
R75 5M6
R76 10M
R77 22M
R1 100K
R20
R57 200R
26 MC14016
FROM SHT 4
+ FF
+ REF 1
+ REF 2
RESET
- REF 2
- REF 1
- FF
a
b
c
+8V
-8V
FROM SHT 4
1SOL o/p FROM Q7 SHT 1
D6
D7
D9
D10
R13 8K2
D1
D3
R55

CONDITION	MULTIPLEXER a	b	c	RESET
RESET	1	1		1
SIG	1	1	0	0
-Ve BIAS	0	1	0	0
+Ve REF 1	1	0	0	0
+Ve REF 2	0	0	0	0
+Ve BIAS	0	1	1	0
-Ve REF 1		0	1	0
-Ve REF 2	0	0		0

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
	D King	MILLIMETRES	INCH DIMENSIONS: DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64. METRIC DIMENSIONS: DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm. UNLESS OTHERWISE STATED. ANGULAR ± °	
TRACED	APPROVED	SCALE: NOT TO BE SCALED		FINISH
DATE 24 6 80	DATE			

datron ELECTRONICS LTD. NORWICH.

TITLE: A-D CONVERTOR 1065

DRAWING SIZE: A1

DRAWING No: 430421

SHEET: 3 OF 5

DRAWING No	430421
FIRST USED ON	1065

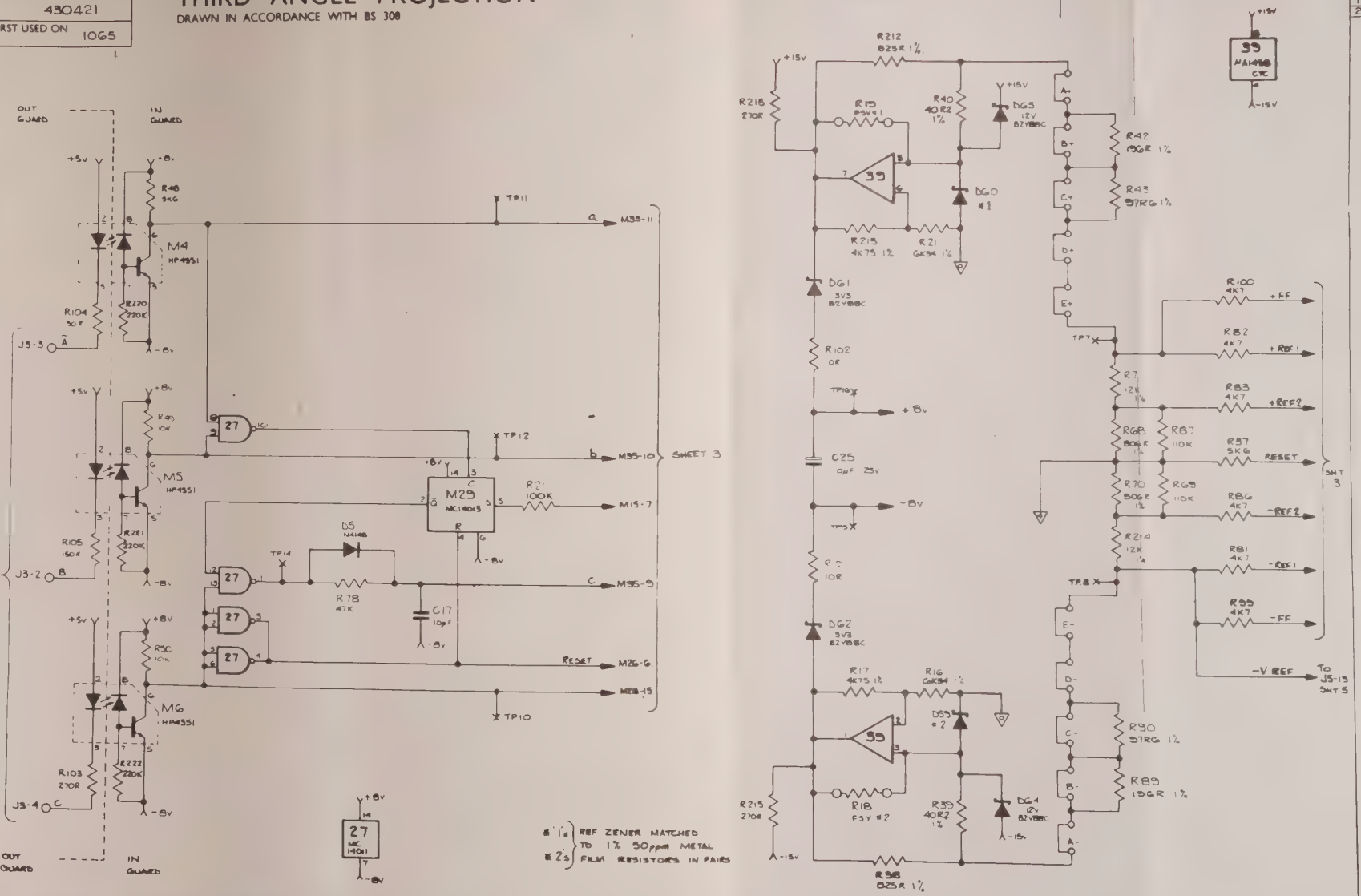
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

CHANGES	
A	
1	RELEASED 18.8.80
2	SEE SHEETS 1 + 3



DRAWN	CHECKED
IL	D KING
TRACED	APPROVED
DATE 24.6.80	DATE

DIMENSIONS IN MILLIMETRES

SCALE NOT TO BE SCALED

TOLERANCES ANGULAR ± .°
INCH DIMENSIONS
DECIMAL TO 3 PLACES ± .005
DECIMAL TO 2 PLACES ± .010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 2 PLACES ± 1mm
DECIMAL TO 1 PLACE ± 2mm
WHOLE DIMENSIONS ± 6mm
UNLESS OTHERWISE STATED

MATERIAL

FINISH

datron ELECTRONICS LTD. NORWICH.

TITLE A-D CONTROL & REFERENCES. 1065

DRAWING SIZE A2

DRAWING No. 430421

SHEET 4 OF 8

DRAWING No. 430421
FIRST USED ON 1065

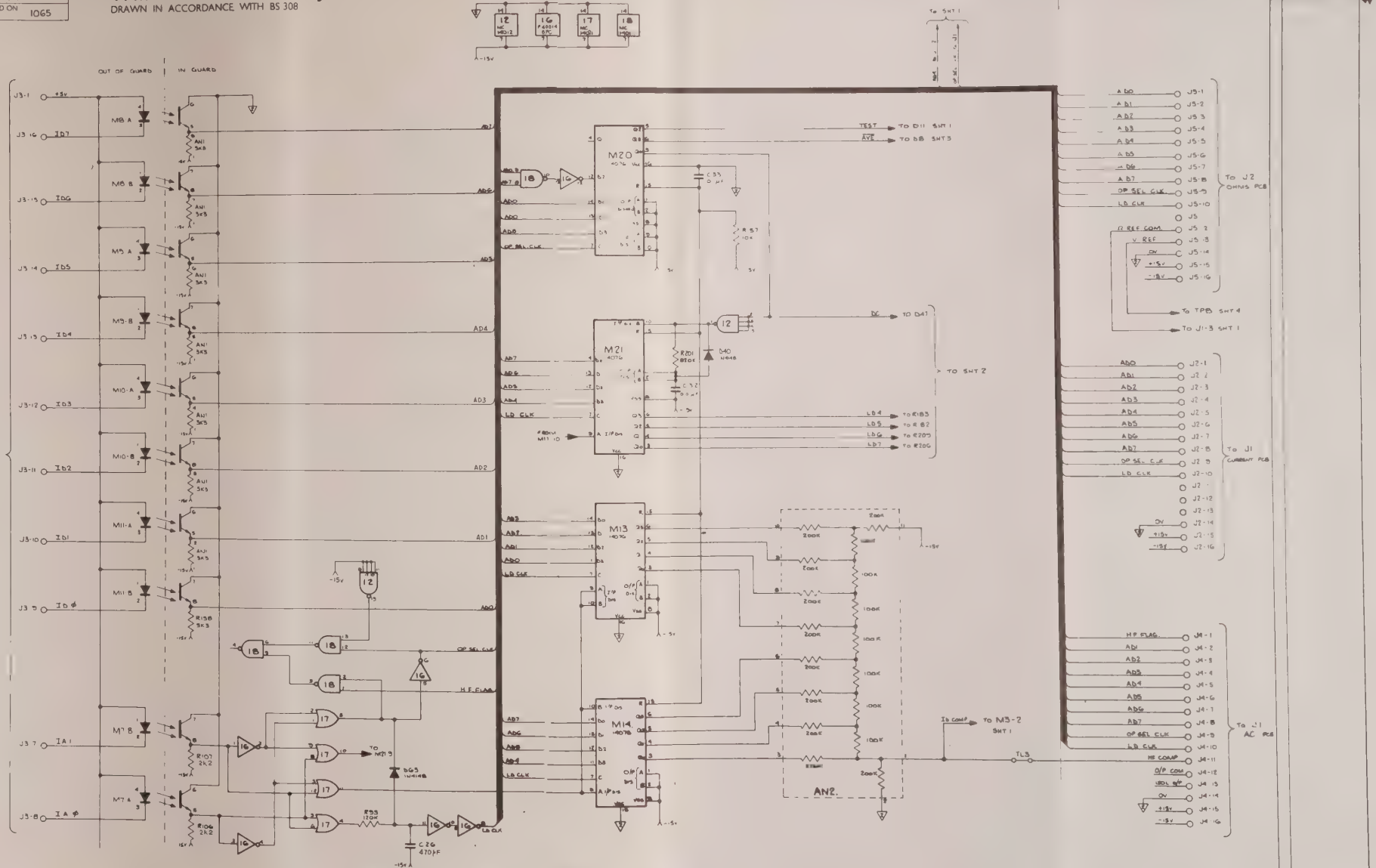
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS	CHANGES
A	
1	RELEASED 18 80
2	SEE SHEETS 1 & 3



DRAWN	CHECKED	DIMENSIONS IN
IL	D KING	MILLIMETRES
TRACED	APPROVED	SCALE
DATE 24 6 80	DATE	NOT TO BE SCALED

TOLERANCES FOR NOT DIMENSIONS: ANGULAR ° ' ; DECIMAL TO 1 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; DIMENSIONS DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; ALL DIMENSIONS ± 4mm UNLESS STATED

MATERIAL —

FINISH —

datron ELECTRONICS LTD. NORWICH.

TITLE: ANALOGUE INTERFACE LOGIC 1065

DRAWING SIZE A1

DRAWING No 430421

SHEET 5 OF 5

DRAWING No 400422
FIRST USED ON 1065

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1 MAKE TP1-TP29 FROM 22SWG BTC WIRE — PART N° 540002
2 LINKS(LK) MADE FROM 22SWG BTC WIRE (540002) AND SLEEVED (EXCEPT FOR LK19–LK34) 590004
3 MOUNT M1 2 17 22 28 29 33 34 37–40, 41–46, 48 49 52 54 55 56 ON 14 WAY DIL SOCKETS PART N° 605037— 21 OFF
4 MOUNT M3–14 16 21 24–27 32 41 42 43/60 47 50 51 53 57 58/61 ON 16 WAY DIL SOCKETS PART N° 605038— 29 OFF
5 MOUNT M30 & 35 ON 24 WAY DIL SOCKETS PART N° 605064
6 MOUNT M19 20 31 36 ON 22 WAY DIL SOCKETS PART N° 605063
7 MOUNT M23 ON 28 WAY DIL SOCKET PART N° 605065
8 MOUNT M55 ON 40 WAY DIL SOCKET PART N° 605050
9 MOUNT M62 ON 8 WAY DIL SOCKET PART N° 605059

ISS	CHANGES
A	
B	R104 ADDED 23/7/80
1	RELEASED 1/8/80
	ECO 1158 11/9/80
2	DR1 ADDED PARTS LIST CHANGED IL 22/9/80

8 WAY POLARISED SOCKET 605052 - 1 OFF

WIRE/TERMINAL ASSY 400379/1 8 OFF

BUS STRIP 920048

COMPONENT CLIP — FIT BETWEEN UNSCREENED LINES ON PCB 630038

FIT CLIP 606005 - 3 OFF TO J1, J2 & J4, AS SHOWN

22 SWG BTC WIRE PIN TO STAND OFF PCB BY 12.0mm 540002

PC BOARD 410096-7A

5 WAY SOLDER TERMINAL 620003 PINS MARKED A, B, C etc

RS1 TO BE MOUNTED ON LINK 1mm ABOVE PCB

NB FREE END OF RS1 WILL BE SOLDERED TO BATTERY B1 AT CHASSIS ASSY STAGE

WHEN FITTING 8K ROM, (M30/M35) REMOVE LK3 AND LK4. FIT LK10 AND LK13

N.B FOR 400Hz OPERATION, LK7 TO BE FITTED AND LK5 50Hz OPERATION TO BE REMOVED

FIT R103 UNDERSIDE OF PCB BETWEEN M40/5 & M40/14

NYLATCH - PLUNGER 617010 - 8 off
NB FIT FROM COMPONENT SIDE OF PCB

NYLATCH - GROMMET 617011 - 8 OFF

SECTION A-A (TYPICAL)

LEAVE LONG AND SOLDER LEAD OF C32 TO R55 AND R56. MAKE CONNECTION ON UNDERSIDE OF PCB

MOUNT JL3 ON 16 WAY D.I.L SOCKET 605038

DRAWN IL	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ° INCH DIMENSIONS DECIMAL TO 1 PLACE ± .005 DECIMAL TO 2 PLACES ± .010 DECIMAL TO 3 PLACES ± .030 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 1 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL
TRACED	APPROVED	SCALE 2:1 NOT TO BE SCALED		FINISH
DATE 30 S 80	DATE			

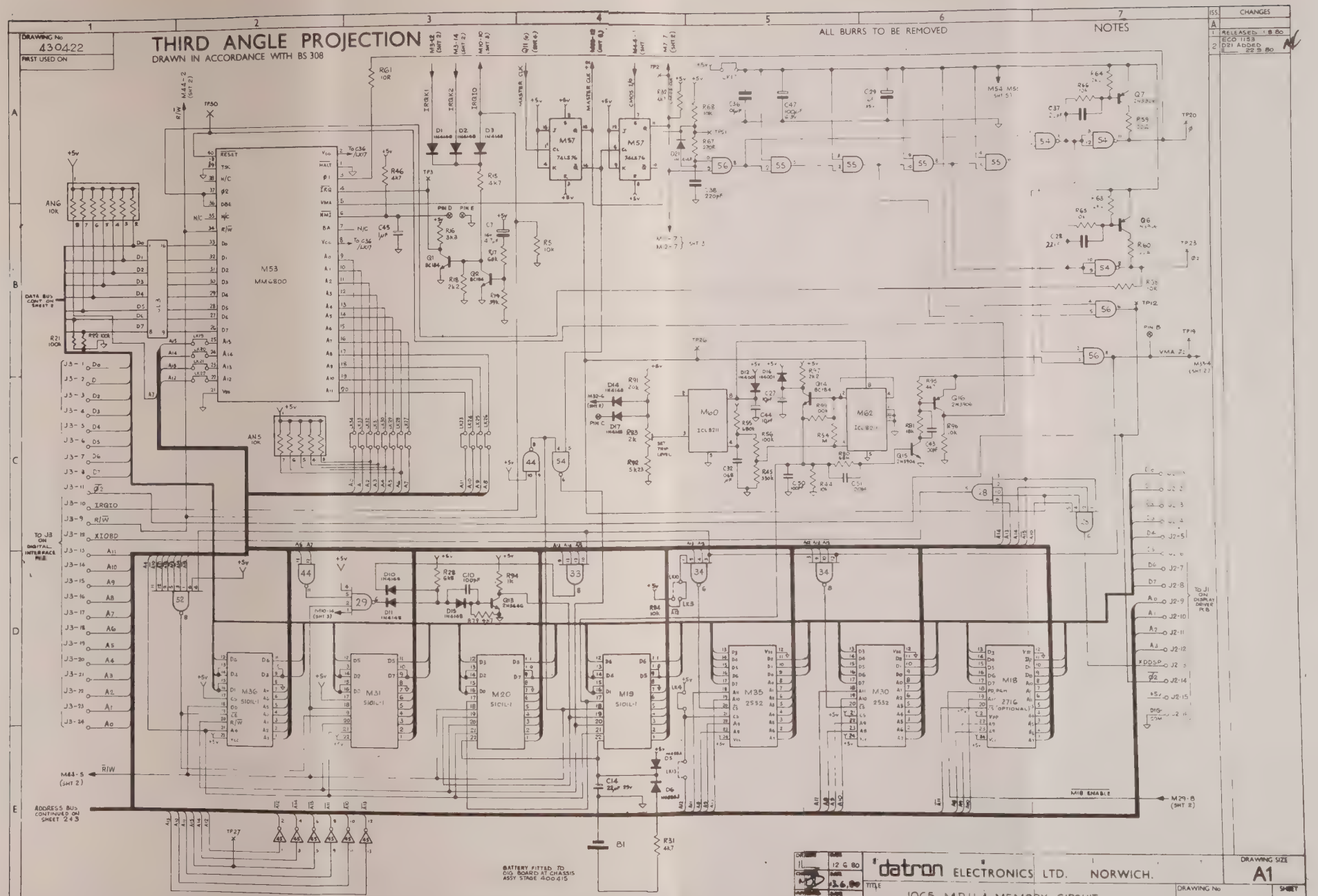
datron ELECTRONICS LTD. NORWICH.

TITLE 1065 DIGITAL PCB. ASSY

DRAWING SIZE A1

DRAWING No 400422

SHEET 1 OF 15


DRAWING No 430422
FIRST USED ON
THIRD ANGLE PROJECTION
DRAWN IN ACCORDANCE WITH BS 308
ALL BURRS TO BE REMOVED
NOTES
ISS CHANGES
A RELEASED 1 8 80
1 ECO 1153
2 D21 ADDED 22 9 80
M53 MMS800
M57 74LS76
M60 ICL8211
M62 ICL8211
M36 SIOIL-1
M31 SIOIL-1
M20 SIOIL-1
M19 SIOIL-1
M35 2532
M30 2532
M18 2716 (5 OPTIONAL)
ANG 10K
ANS 10K
DATA BUS CONT ON SHEET 9
TO J3 ON DIGITAL INTERFACE PCB
TO J1 ON DISPLAY DRIVER PCB
ADDRESS BUS CONTINUED ON SHEET 2&3
BATTERY FITTED TO DIG BOARD AT CHASSIS ASSY STAGE 400415
M18 ENABLE
datron ELECTRONICS LTD. NORWICH.
DRAWING SIZE A1
TITLE 1065 MPU & MEMORY CIRCUIT
DRAWING No 430422
SHEET 1 OF 5

DRAWING No 430422

NEXT USED ON

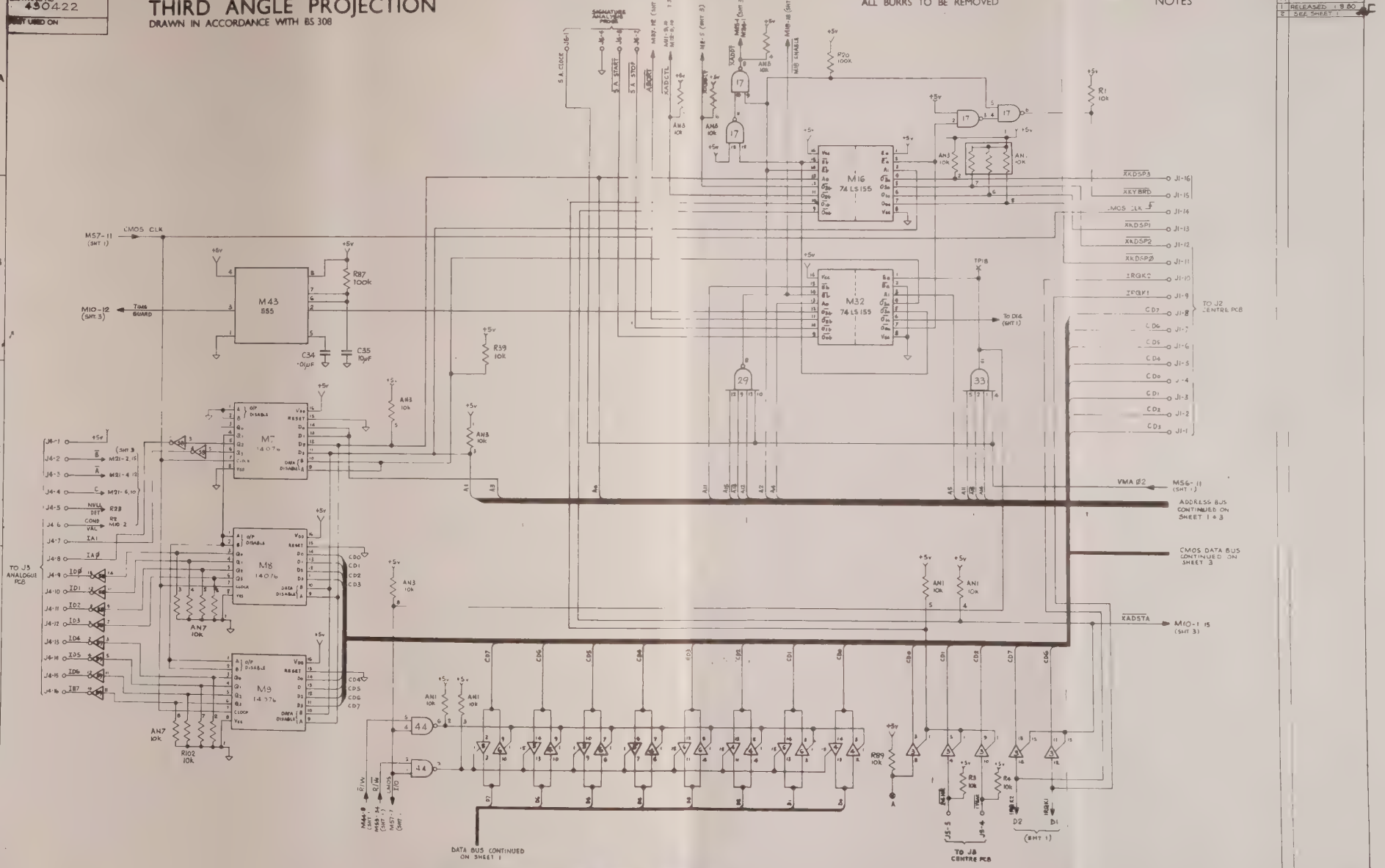
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

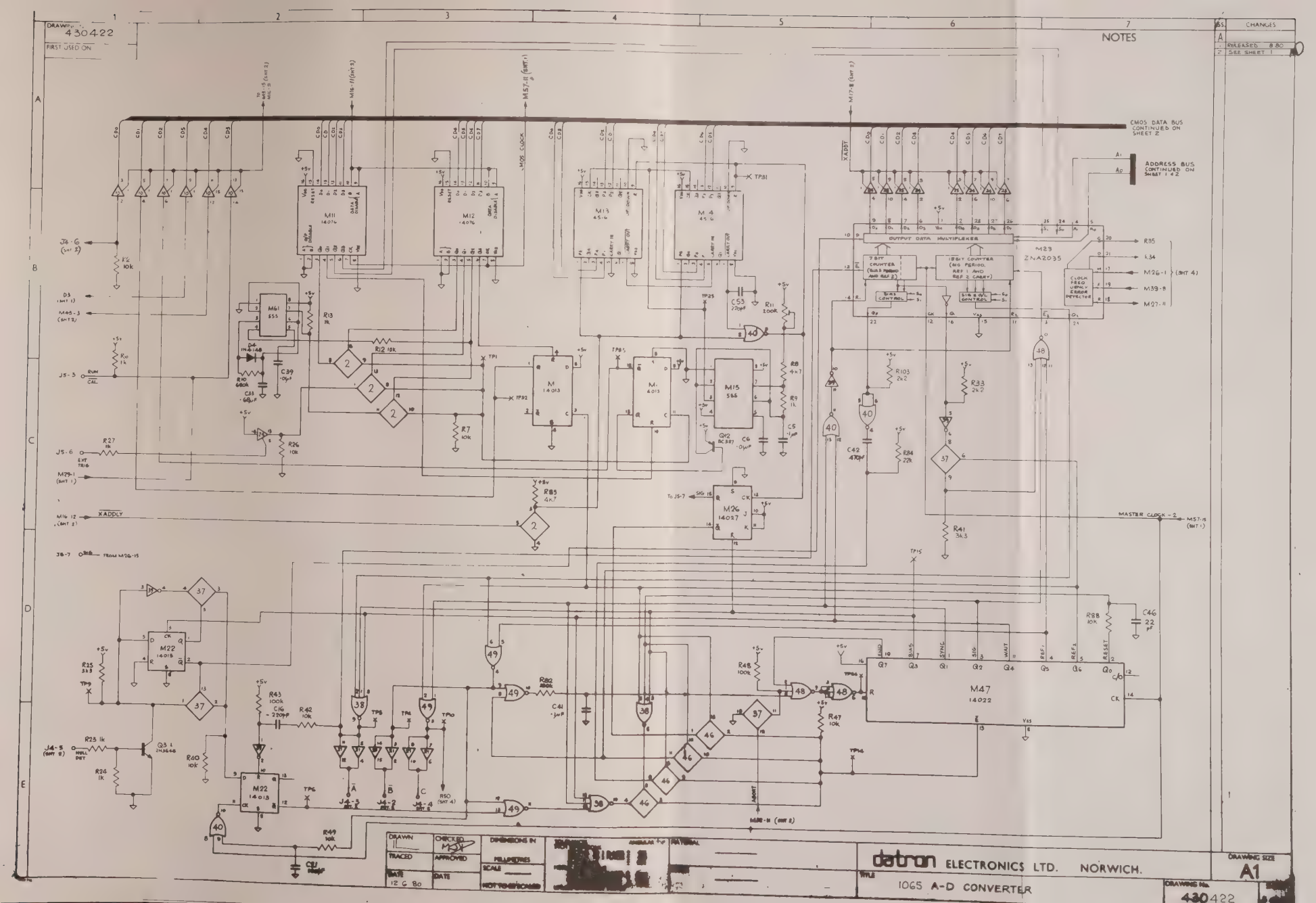
ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
A	
1	RELEASED 19 80
2	SEE SHEET 1



DRAWN IL	CHECKED MSD	DIMENSIONS IN MILLIMETRES	datron ELECTRONICS LTD. NORWICH.
TRACED	APPROVED	SCALE —	TITLE 1065 CMOS ADDRESS DECODE & I/O CIRCUIT
DATE 12 6 80	DATE	NOT TO BE SCALED	DRAWING SIZE A1
			DRAWING No 430422
			SHEET 2 OF 5


DRAWING 430422
FIRST USED ON
NOTES
CHANGES
RELEASED 8 80
SEE SHEET 1
CMOS DATA BUS CONTINUED ON SHEET 2
ADDRESS BUS CONTINUED ON SHEET 1 & 2
OUTPUT DATA MULTIPLEXER
M23 ZNA2035
7 BIT COUNTER
8 BIT COUNTER
M47 14022
M26 14027
M15 555
M61 555
MASTER CLOCK - 2
XADDLY
RUN CAL
EXT TRIG
M65-3 (SHT 3)
M26-1 (SHT 4)
M39-8
M27-11
M57-15 (SHT 1)
M16-12 (SHT 2)
J6-7 FROM M26-15
J4-5 (SHT 2)
J4-3 (SHT 2)
J4-2 (SHT 2)
J4-4 (SHT 2)
RSO (SHT 4)
M66-11 (SHT 2)
DRAWN IL
TRACED
DATE 12 G 80
CHECKED MSH
APPROVED
DATE
DIMENSIONS IN MILLIMETRES
SCALE
NOT TO BE SCALED
MATERIAL
datron ELECTRONICS LTD. NORWICH.
TITLE 1065 A-D CONVERTER
DRAWING SIZE A1
DRAWING No. 430422

DRAWING No. 430422

FIRST USED ON

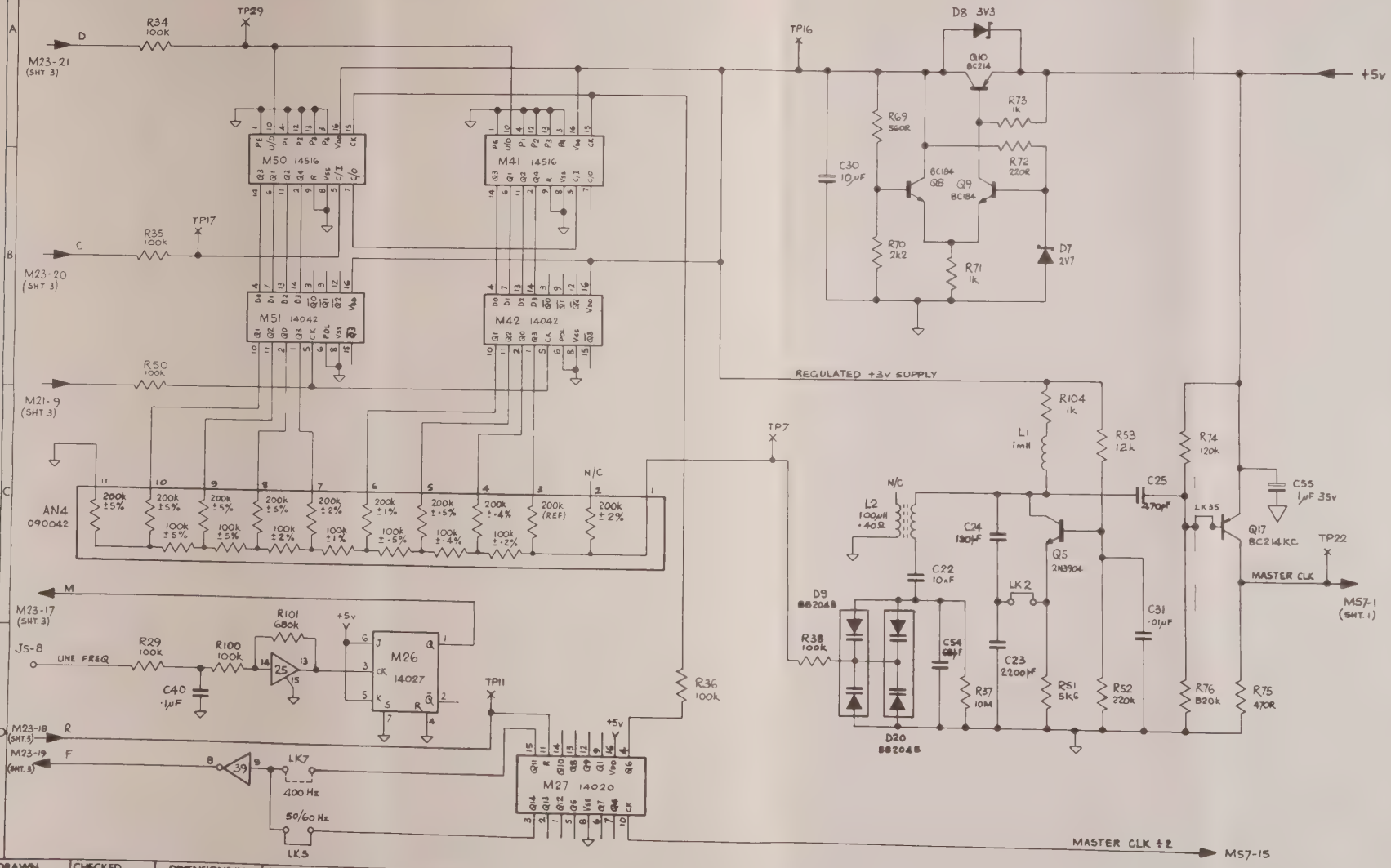
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1	RELEASED FOR BUILD
2	SEE SHEET 1



DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES ANGULAR ± °	MATERIAL	
TRACED	APPROVED	MILLIMETRES	INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64		
DATE 12.6.80	DATE	SCALE NOT TO BE SCALED	METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	FINISH	

datron ELECTRONICS LTD. NORWICH.

TITLE 1065 LINE LOCKING CIRCUIT

DRAWING SIZE A2

DRAWING No. 430422

SHEET 1 OF 3

DRAWING No. 430422

FIRST USED ON

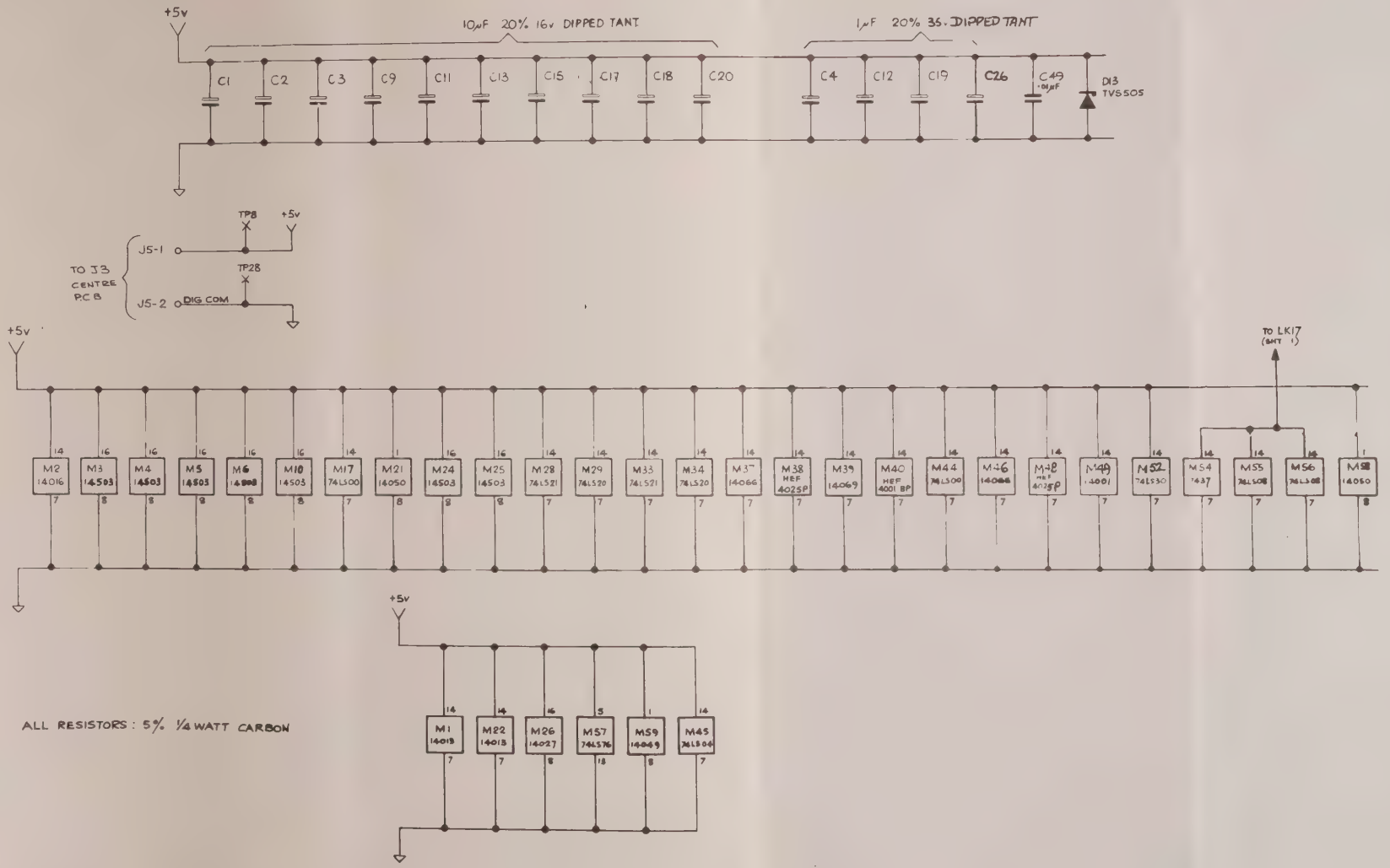
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

No.	CHANGES
A	
1	RELEASED 1.8.80
2	SEE SHEET 1



ALL RESISTORS: 5% ¼ WATT CARBON

DRAWN IL	CHECKED MOH	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 0.1mm DECIMAL TO 1 PLACE ± 0.2mm ANGULAR ± 0.5°	MATERIAL	datron ELECTRONICS LTD. NORWICH.
TRACED	APPROVED	SCALE NOT TO BE SCALED		FINISH	DRAWING SIZE A2
DATE 12.6.80	DATE			TITLE 1065 DIGITAL PCB. ASSY.	DRAWING No. 430422 SHEET 1 OF 6

DRAWING No. 400423
FIRST USED ON 1065

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

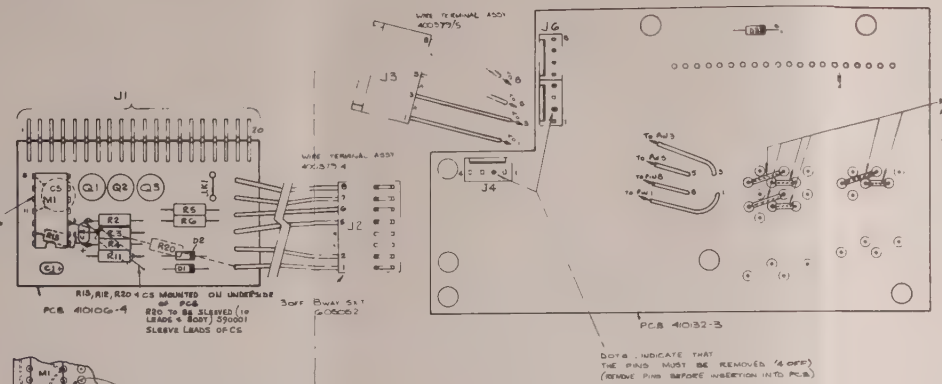
ALL BURRS TO BE REMOVED

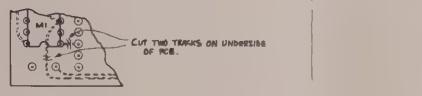
NOTES

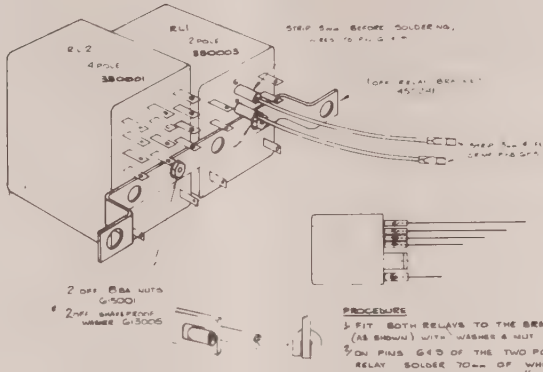
IMPORTANT

FOR CRIMP PINS USE TOOL Nº HTR 22662.

ISS	CHANGES
A	
1	RELEASED 1.8.80
2	ECO 1164 1165 R2 R4 R18 R20 C3 C9. D2 & D3 ADDED M.... 1.10.80

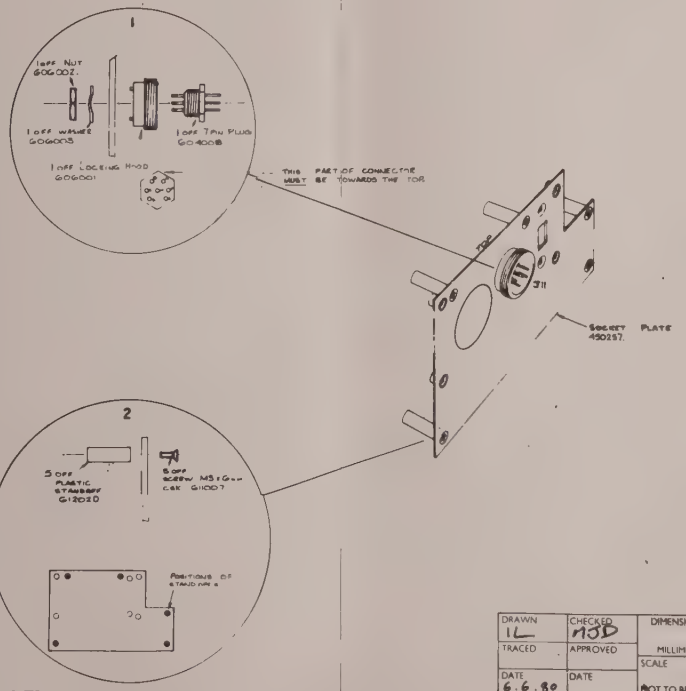

WIRE TERMINAL ASSY 400379/5
J1
J3
J6
J4
J2
FIT M1 IN 14 WAY DIL SOCKET. No 606057.
RIB, RIR, R20 & CS MOUNTED ON UNDERSIDE OF PCB.
R20 TO B8 SLEEVED (10 LEADS & BODY) 590001 SLEEVE LEADS OF CS
3OFF BWAY SKT 606062
PCB 410106-4
WIRE TERMINAL ASSY 400379/4
FIT SIX LINKS SLEEVED AS SHOWN. LINKS 22AWG COPPER WIRE 540002. SLEEVING 590004
To Pin3
To Pin5
To Pin6
To Pin1
PCB 410132-3
DOTS INDICATE THAT THE PADS MUST BE REMOVED (6 OFF) (REMOVE PINS BEFORE INSERTION INTO PCB)





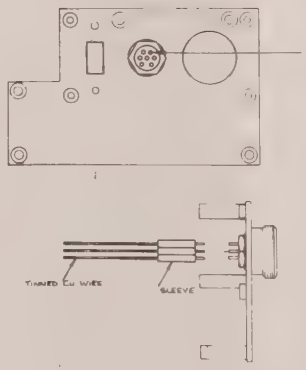
PROCEDURE

1. FIT BOTH RELAYS TO THE BRACKET (AS SHOWN) WITH WASHER & NUT
2. ON PINS 6 & 5 OF THE TWO POLE RELAY SOLDER 70mm OF WHITE WIRE PART NO 540008 SLEEVE WITH ½" PIECE OF 590001 (10 10mm)
3. ALL OTHER CONTACTS ARE TO HAVE APPROXIMATELY 60mm OF 22 SWG TINNED COPPER WIRE PART Nº 540002. & SLEEVE EACH WITH ½" PIECE OF 590001
4. STAGGER LENGTHS OF TINNED COPPER WIRE TO ASSIST FITTING TO PCB AS SHOWN



PROCEDURE

1. ASSEMBLE THE 7 PIN PLUG FIRST & ENSURE THAT THE CONNECTOR IS SECURED IN THE POSITION SHOWN.
2. ASSEMBLE THE 5 STANDOFFS IN THE POSITION SHOWN BY THE LARGE DOTS



PROCEDURE

1. ALL PINS ON THE SOCKET EXCEPT PIN 8 (SHOWN SOLID) SOLDER ON 60mm OF TINNED COPPER WIRE PART Nº 540002 & SLEEVE ALL JOINTS WITH APPROXIMATELY 15mm OF SLEEVING PART NO 590001. THERE SHOULD NOW BE 8 WIRES.

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
IL	MJD	MILLIMETRES	INCH DIMENSIONS DECIMAL TO 1 PLACES ± .1 DECIMAL TO 2 PLACES ± .01 FRACTIONAL ± 1/32	
TRACED	APPROVED	SCALE	METRIC DIMENSIONS DECIMAL TO 1 PLACES ± .1 DECIMAL TO 1 PLACE ± .01 WHOLE DIMENSIONS ± 1 UNLESS OTHERWISE STATED	
DATE 6.6.80	DATE	NOT TO BE SCALED	ANGULAR ± 1°	

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A1

TITLE: REAR INPUT ASSY 1065

DRAWING No 400423

SHEET 1 OF 7

400423

1065

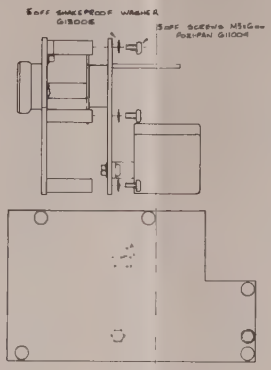
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS	CHANGES
A	
1	RELEASED : 1 8 80
2	SEE SHEET 1



3/ BOTTOM VIEW SHOWS THE HOLES IN THE PCB (INDICATED BY CROSSES). THESE HOLES ARE FOR THE WIRES FROM THE 7 PIN SOCKET.

IT IS A SUGGESTION THAT THE WIRES ARE STAGGERED TO MAKE ASSY EASIER 'AS WIRING THE RELAYS'

PROCEDURE

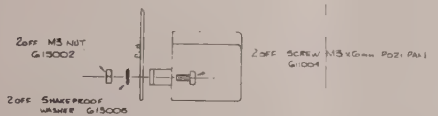
1. THE WIRES SHOULD LINE UP WITH THE APPROPRIATE HOLES; IE WIRE FROM PIN A OF SOCKET SHOULD BE INSERTED INTO HOLE A, WIRE FROM PIN C TO HOLE C AND SO ON.
2. WHEN THE WIRES ARE INSERTED IN THE APPROPRIATE HOLES SECURE THE 2 ASSY'S TOGETHER WITH THE M3 x 6mm POZI PAN SCREWS & SHAKEPROOF WASHERS, SCREWED IN THE 5 STANDOFFS (AS DETAILED)
3. LIGHTLY PULL ON THE TIN COPPER WIRES SO THE WIRE IS TAUT, THEN SOLDER & CROP IN THE USUAL MANNER.

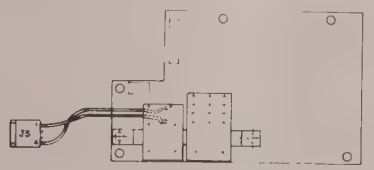
2/ INSERT CONNECTORS AS SHN. SOLDER ALL 20 AMP PINS & I.C. LEGS IN USUAL MANNER. THE BOARD IS TO BE AT 90° WHEN SPLOSERT IN

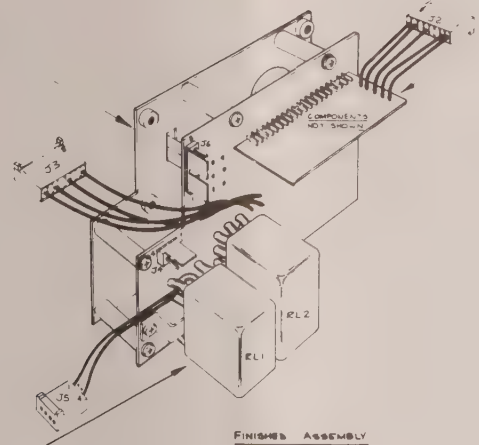
1/ SKETCH BELOW SHOWS THE 2 RELAY & BRACKET ASSEMBLY (FROM SHEET 1). THE CROSSES INDICATE HOLES IN THE PCB INTO WHICH THE WIRES FROM THE RELAYS ARE INSERTED

PROCEDURE

1. INSERT THE WIRES INTO THE APPROPRIATE HOLES IN THE PCB (WIRES CUT AT DIFFERENT LENGTHS TO AID ASSEMBLY)
2. WHEN THE WIRES ARE ALL IN PLACE SECURE THE BRACKET TO THE PCB USING THE SCREWS WASHERS & NUTS SHOWN BELOW.
3. SOLDER & CROP WIRES IN THE USUAL MANNER. INSERT THE CRIMP PINS INTO SOCKET J5 PIN 6 OF RELAY TO PIN 4 OF J5 & PIN 5 TO PIN 1 AS SHOWN BELOW





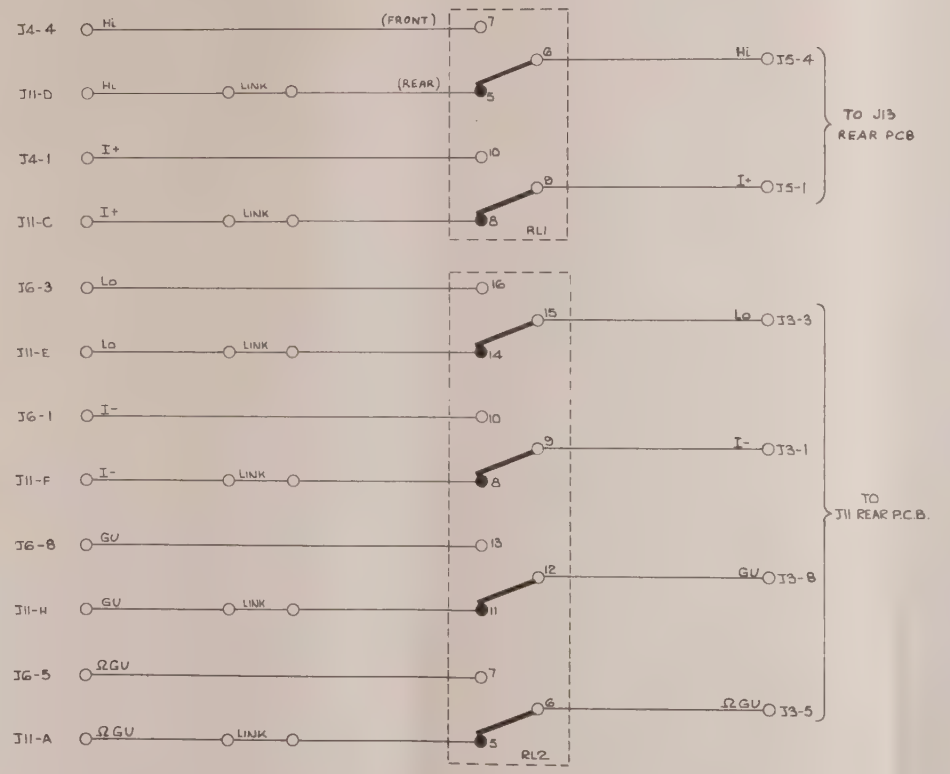


FINISHED ASSEMBLY

DRAWN IL	CHECKED MJP	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 1 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm; UNLESS OTHERWISE STATED; ANGULAR ± °	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
TRACED	APPROVED	SCALE NOT TO BE SCALED		FINISH	TITLE REAR INPUT ASSY 1065	DRAWING No 400423 SHEET 2 OF 7
DATE 6 6 80	DATE					

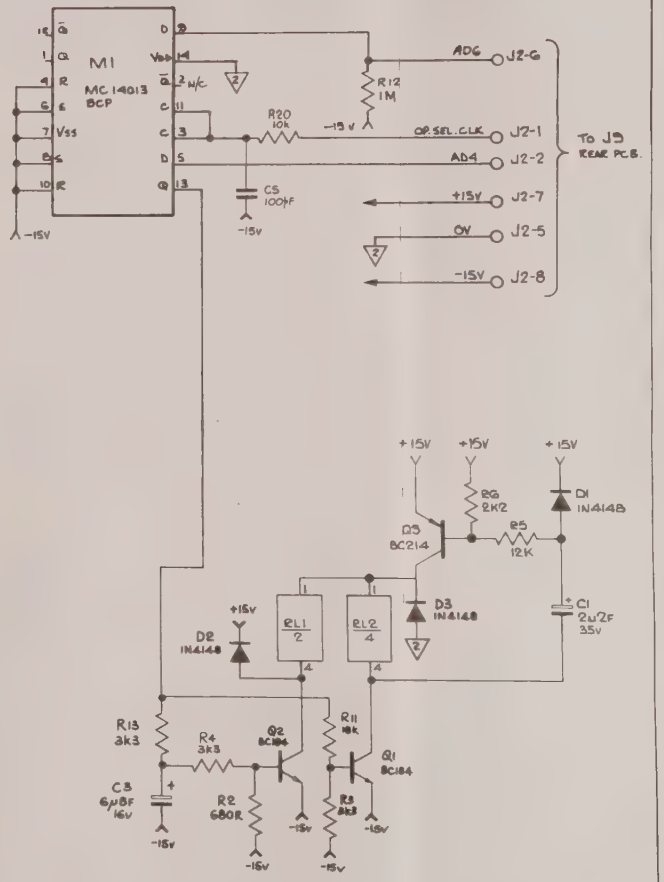
DRAWING No.	THIRD ANGLE PROJECTION	ALL BURRS TO BE REMOVED	NOTES
430423	DRAWN IN ACCORDANCE WITH BS 308		
FIRST USED ON 1065			

ISS.	CHANGES
1	RELEASED 1.8.80
2	ECO. 1154. 1140 R2 R4 R13 R20 C3 C5 D2 & Q2 ADDED IL 30 9 80



NOTES.
1. J4 & J6 ARE FROM FRONT PANEL TERMINALS.
2. J11 IS THE REAR INPUT SOCKET ON REAR PANEL.

UNUSED PINS.
J2 = 3 & 4.
J3 = 2, 3, 5 & 7
J4 = 2, 3
J5 = 2, 3
J6 = 2, 3, 5 & 7



DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
IL	MSP	MILLIMETRES	INCH DIMENSIONS: DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; METRIC DIMENSIONS: DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm; UNLESS OTHERWISE STATED; ANGULAR ± .5°	
TRACED	APPROVED	SCALE		FINISH
DATE 10.6.80	DATE 17 MAY 79	NOT TO BE SCALED		

datron ELECTRONICS LTD. NORWICH.

TITLE: 1065 REAR INPUT CIRCUIT DIAGRAM.

DRAWING SIZE: A2

DRAWING No. 430423

SHEET 1 OF 1.

DRAWING No. 400425
FIRST USED ON 1065

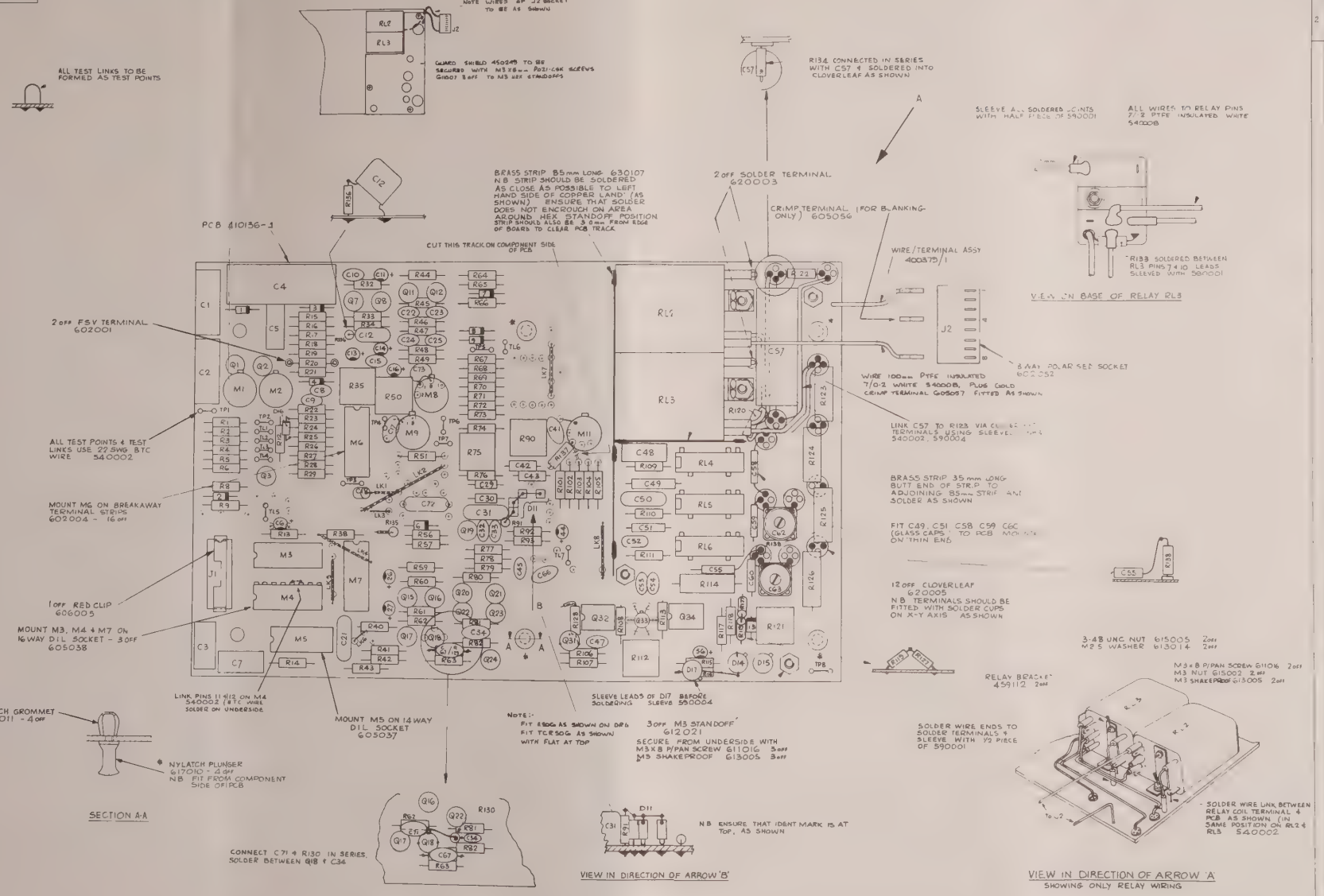
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

CHANGES	
A	
B	PARTS LIST CHANGES TO R25 C8 C22 C23 24 7 80
1	RELEASED 8 80
2	ECO 1150 1152 1155 1162 R138 ADDED. STEATITE BEADS (MTG DIA) DELETED. PARTS LIST CHANGES 11 8 9 80


NOTE WIRES OF J2 SOCKET TO BE AS SHOWN
GUARD SHIELD 450249 TO BE SECURED WITH M3 X 8 m/m POZI-CSK SCREWS GHOST BASE TO M3 HEX STANDOFFS
ALL TEST LINKS TO BE FORMED AS TEST POINTS
R134 CONNECTED IN SERIES WITH C57 & SOLDERED INTO CLOVERLEAF AS SHOWN
SLEEVE ALL SOLDERED JOINTS WITH HALF PIECE OF 590001
ALL WIRES TO RELAY PINS 7/2 PTFE INSULATED WHITE 540008
BRASS STRIP 85mm LONG 630107 N.B STRIP SHOULD BE SOLDERED AS CLOSE AS POSSIBLE TO LEFT HAND SIDE OF COPPER LAND (AS SHOWN) ENSURE THAT SOLDER DOES NOT ENCROUCH ON AREA AROUND HEX STANDOFF POSITION STRIP SHOULD ALSO BE 3.0 mm FROM EDGE OF BOARD TO CLEAR PCB TRACK
2 OFF SOLDER TERMINAL 620003
CRIMP TERMINAL (FOR BLANKING ONLY) 605056
PCB 410136-1
CUT THIS TRACK ON COMPONENT SIDE OF PCB
WIRE/TERMINAL ASSY 400375/1
R133 SOLDERED BETWEEN RL3 PINS 7 & 10 LEADS SLEEVED WITH 590001
VIEW ON BASE OF RELAY RL3
2 OFF F.S.V TERMINAL 602001
8 WAY POLARISED SOCKET 602052
WIRE 100mm PTFE INSULATED 7/0.2 WHITE 540008, PLUS GOLD CRIMP TERMINAL 605057 FITTED AS SHOWN
LINK C57 TO R123 VIA CENTRE TWO TERMINALS USING SLEEVES TYPE 540002, 590004
ALL TEST POINTS & TEST LINKS USE 22 SWG BTC WIRE 540002
BRASS STRIP 35 mm LONG BUTT END OF STRIP TO ADJOINING 85mm STRIP AND SOLDER AS SHOWN
MOUNT MG ON BREAKAWAY TERMINAL STRIPS 602004 - 16 off
FIT C49, C51, C58, C59, C60 (GLASS CAPS) TO PCB MOUNTED ON THIN END
1 OFF RED CLIP 606005
12 OFF CLOVERLEAF 620005
N.B TERMINALS SHOULD BE FITTED WITH SOLDER CUPS ON X-Y AXIS AS SHOWN
MOUNT M3, M4 & M7 ON 16 WAY DIL SOCKET - 3 OFF 605038
3-48 UNC NUT 615005 2 off
M2.5 WASHER 613014 2 off
M3 x 8 P/PAN SCREW 611016 2 off
M3 NUT 615002 2 off
M3 SHAKEPROOF 613005 2 off
RELAY BRACKET 459112 2 off
LINK PINS 11 & 12 OF M4 540002 (BTC WIRE) SOLDER ON UNDERSIDE
SOLDER WIRE ENDS TO SOLDER TERMINALS & SLEEVE WITH ½ PIECE OF 590001
* NYLATCH GROMMET 617011 - 4 off
MOUNT M5 ON 14 WAY DIL SOCKET 605037
NOTE:- FIT 450G AS SHOWN ON DP6 FIT TCR50G AS SHOWN WITH FLAT AT TOP
3 off M3 STANDOFF 612021
SECURE FROM UNDERSIDE WITH M3 x 8 P/PAN SCREW 611016 3 off
M3 SHAKEPROOF 613005 3 off
SLEEVE LEADS OF DI7 BEFORE SOLDERING SLEEVE 590004
* NYLATCH PLUNGER 617010 - 4 off
NB FIT FROM COMPONENT SIDE OF PCB
SECTION A-A
SOLDER WIRE LINK BETWEEN RELAY COIL TERMINAL & PCB AS SHOWN (IN SAME POSITION ON RL2 & RL5 540002
CONNECT C71 & R130 IN SERIES, SOLDER BETWEEN Q18 & C34
N.B ENSURE THAT IDENT MARK IS AT TOP, AS SHOWN
VIEW IN DIRECTION OF ARROW 'B'
VIEW IN DIRECTION OF ARROW 'A'
SHOWING ONLY RELAY WIRING

DRAWN IL	CHECKED PPG	DIMENSIONS IN	TOLERANCES INCH DIMENSIONS DECIMAL TO 1 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	ANGULAR ± °	MATERIAL AS PARTS LIST	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
TRACED	APPROVED	MILLIMETRES			FINISH —	TITLE AC PCB ASSY 1065	DRAWING No 400425 SHEET 1 OF 2
DATE 17 7 80	DATE 22 7 80	SCALE 2:1 NOT TO BE SCALED					

DRAWING N 430425
FIRST USED ON 1065

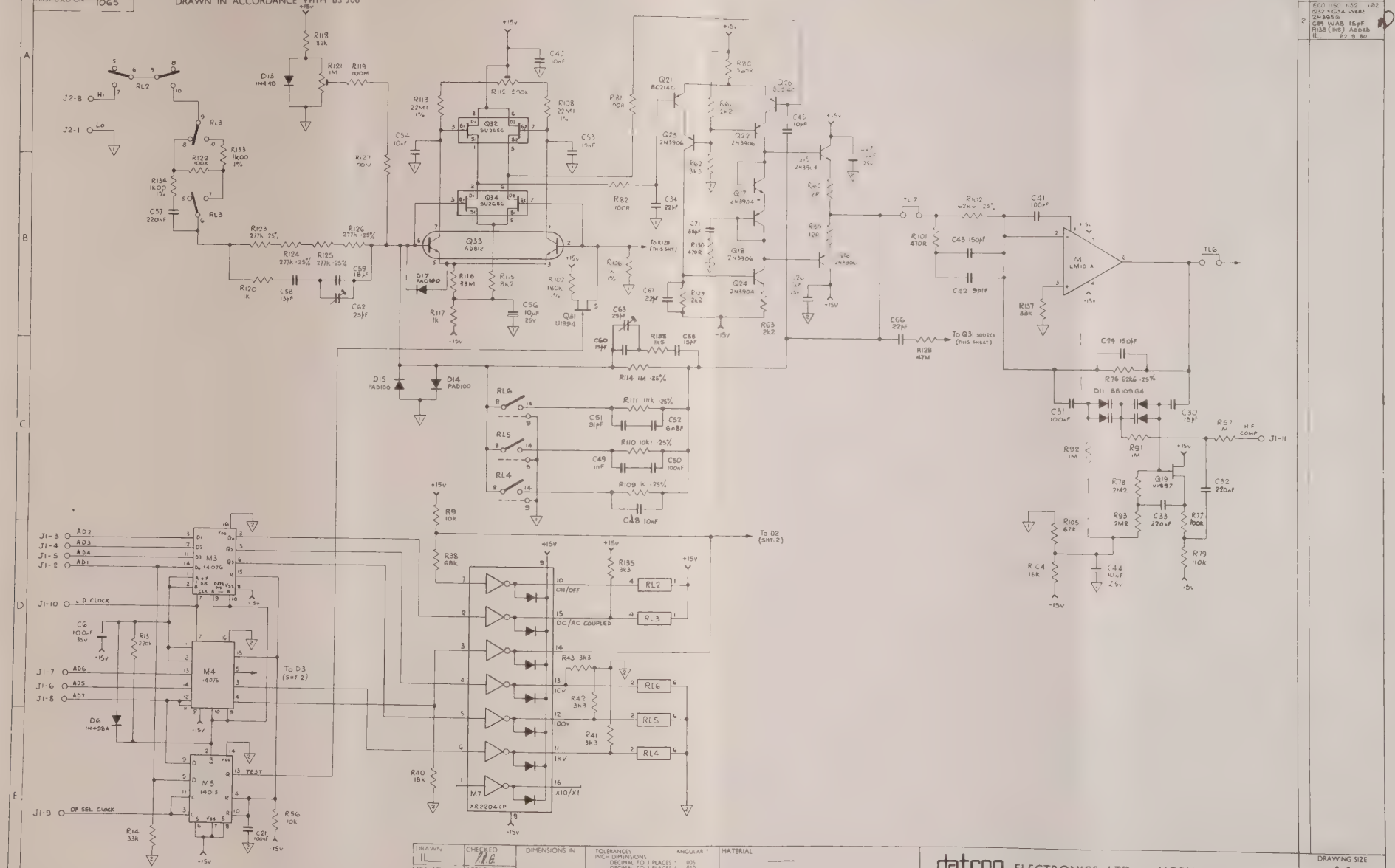
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

	CHANGES
A	
B	SEE SHT 2
1	RELEASED 18 8 80
	ECO 1150 1152 1162 Q32 + Q34 WERE 2N3956
2	C39 WAS 15pF R138 (1K5) ADDED 22 9 80



DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
IL	MG	MILLIMETRES	INCH DIMENSIONS: DECIMAL TO 1 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; METRIC DIMENSIONS: DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm; UNLESS OTHERWISE STATED; ANGULAR ±	
TRACED	APPROVED	SCALE		FINISH
DATE 18 7 80	DATE 22 7 80	NOT TO BE SCALED		

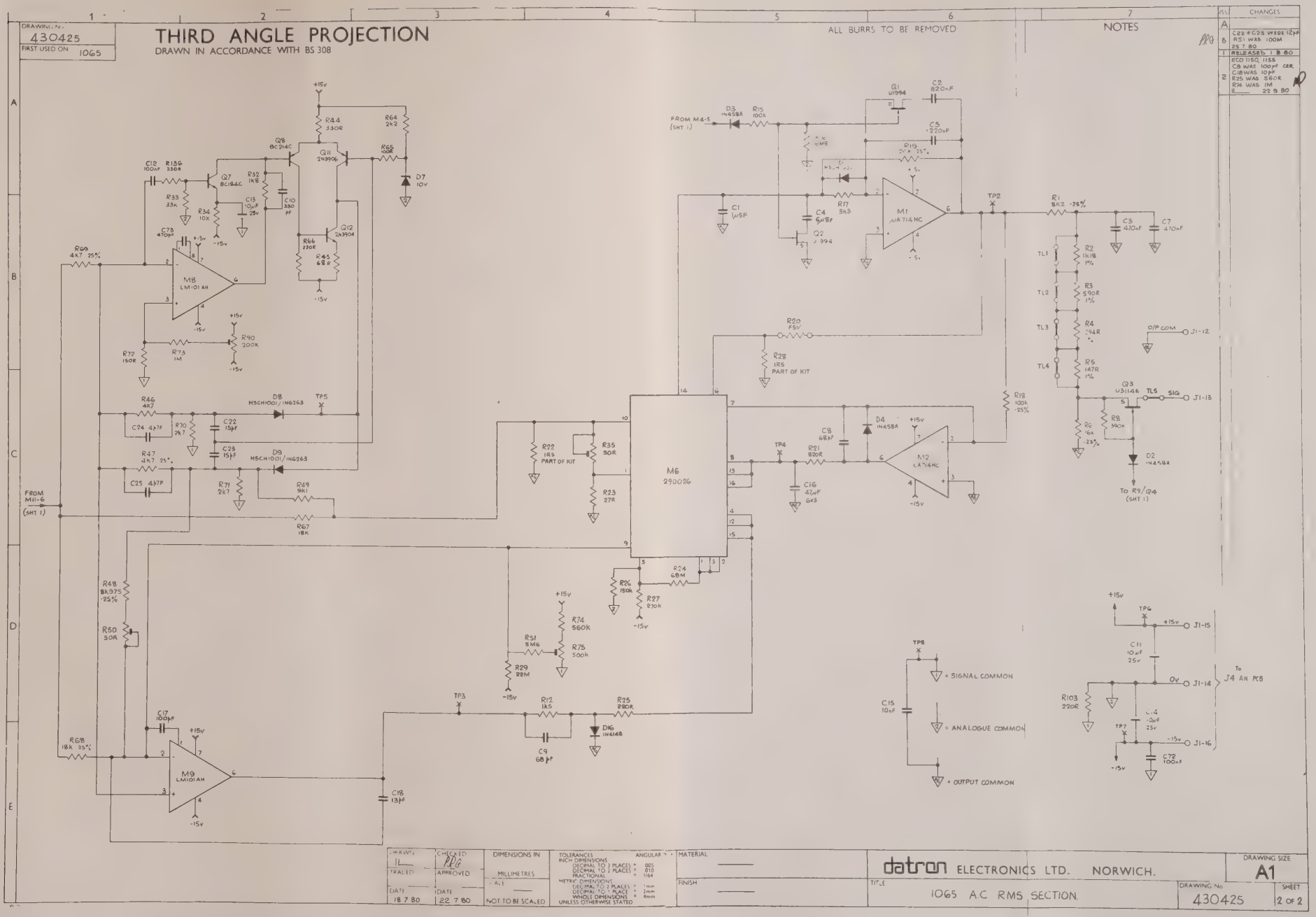
datron ELECTRONICS LTD. NORWICH.

TITLE 1065 AC - PREAMP

DRAWING SIZE A1

DRAWING No 430425

SHEET 1 OF 2


DRAWING No. 430425
FIRST USED ON 1065
THIRD ANGLE PROJECTION
DRAWN IN ACCORDANCE WITH BS 308
ALL BURRS TO BE REMOVED
NOTES
CHANGES
A C22 & C23 WERE 12pF R51 WAS 100M 25.7.80
RELEASED 1.8.80
2 ECO 1150, 1156 C8 WAS 100pF CER C18 WAS 10pF R25 WAS 560R R26 WAS 1M 22.9.80
+15v
-15v
M8 LM101AH
M9 LM101AH
M1 uA714HC
M2 uA714HC
M6 290026
Q1 U1994
Q2 U994
Q3 U3114A
Q7 BC184C
Q8 BC214C
Q11 2N3906
Q12 2N3904
D2 IN4458A
D3 IN4458A
D4 IN4458A
D7 10V
D8 HSCH1001/IN6263
D9 HSCH1001/IN6263
D16 IN4148
R1 8K2 .25%
R2 11K18 1%
R3 590R 1%
R4 294R 1%
R5 147R 1%
R6 16k .25%
R8 390K
R9 10K .25%
R10 5K
R12 1K5
R15 100K
R17 3K3
R18 100R .25%
R19 20K .25%
R20 FSV
R21 820R
R22 1R5 PART OF KIT
R23 27R
R24 68M
R25 280R
R26 150k
R27 270k
R28 1R5 PART OF KIT
R29 22M
R32 1K8
R33 33K
R34 10K
R35 30R
R44 330R
R45 68R
R46 4K7
R47 4K7 .25%
R48 8K975 .25%
R49 9K1
R50 50R
R51 5M6
R64 2K2
R65 330R
R66 220R
R67 18K
R68 18K .25%
R69 4K7 .25%
R70 2K7
R71 2K7
R72 150R
R73 1M
R74 560k
R75 500k
R90 200K
C1 1µ5F
C2 820nF
C3 470nF
C4 5n6F
C5 220nF
C6 10nF
C7 470nF
C8 68pF
C9 68pF
C10 330pF
C11 10µF 25v
C12 100nF
C13 10µF 25v
C15 10nF
C16 47µF 6v3
C17 100pF
C18 13pF
C22 15pF
C23 15pF
C24 4µ7F
C25 4µ7F
C73 470pF
C74 100nF
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TL1
TL2
TL3
TL4
TLS
SIG
O/P COM
J1-12
J1-13
J1-15
J1-14
J1-16
0v
FROM M11-6 (SHT 1)
FROM M4-5 (SHT 1)
To R9/Q4 (SHT 1)
To J4 AN PCB
= SIGNAL COMMON
= ANALOGUE COMMON
= OUTPUT COMMON
DRAWN IL
TRACED
DATE 18.7.80
CHECKED PRG
APPROVED
DATE 22.7.80
DIMENSIONS IN MILLIMETRES
SCALE NOT TO BE SCALED
TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm ANGULAR ± °
MATERIAL
FINISH
datron ELECTRONICS LTD. NORWICH.
TITLE 1065 A.C RMS SECTION.
DRAWING SIZE A1
DRAWING No 430425
SHEET 2 OF 2

DRAWING No. 400426
FIRST USED ON 1065

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
B	
1	RELEASED 1 8 80
2	ECO 1164 PCB WAS 1551S LK20 ADDED 24 9 80

NYLATCH - PLUNGER 617010 — 4 off

NYLATCH - GROMMET 617011 — 4 off

COMP SIDE OF PCB

SECTION A-A (TYPICAL)

MOUNT R2 & R9 WITH 2off PORCELAIN BEADS 620024 ON EACH LEG, AS SHOWN

R2 + R9

PCB 410093-5A

NOTE! ALL WIRE IS 540008 PTFE INSULATED - WHITE
ALL WIRE LENGTHS SHOWN ON RELAY ARE TOTAL LENGTHS 4mm IS TO BE STRIPPED FROM EACH END
SLEEVE WIRES WITH 590001 (½ PIECE) FOR EACH CONNECTION 1⌀ 1 PIECE FOR EACH WIRE

12 WAY POLARISED SOCKET 605053 1off

WIRE/TERMINAL ASSY. 400378/2 6off

SOLDER PCB TERMINAL 620005 8off

MOUNT M7 & M8 ON 16 WAY DIL SOCKET 605038 2off

MOUNT M1, M2, M5, M6 & M9 ON 14 WAY DIL SOCKET 605037 5off

LINK M9 PINS 4 AND 10 SLEEVE LINK BEFORE SOLDERING TO UNDERSIDE OF PCB 540002/590004

16 WAY DIL SOCKET 605002 1off

RED C-CLIP 1off 606005

ALL TEST POINTS TO BE MADE FROM 22 SWG BTC WIRE 540002

NB SOME LINK SHOWN AS TEST POINT LOOPS SHOULD ALSO BE FORMED THUS, FOR EASE OF PRODUCTION (e.g. LK1)

35mm LONG WIRE SLEEVE & SOLDER TO TERMINAL 14.

35mm LONG WIRE SLEEVE & SOLDER TO TERMINAL 16

15mm LONG WIRE SLEEVE & SOLDER TO TERMINAL 11

TAG Nº 4 LINKED TO PCB USING 22 SWG. BTC. WIRE 540002

TAGS Nº 7 & Nº 13 LINKED TOGETHER USING 20mm LONG WIRE

TAGS Nº 9 & Nº 15 JOINED TOGETHER (SOLDERED)

20mm LONG WIRE SLEEVE & SOLDER TO TERMINAL 1

35mm LONG WIRE SLEEVE & SOLDER TO TERMINAL 10

30mm LONG WIRE SLEEVE & SOLDER TO TERMINAL 12

35mm LONG WIRE SLEEVE & SOLDER TO TERMINAL 8

55mm LONG WIRE SLEEVE & SOLDER TO TERMINAL 6

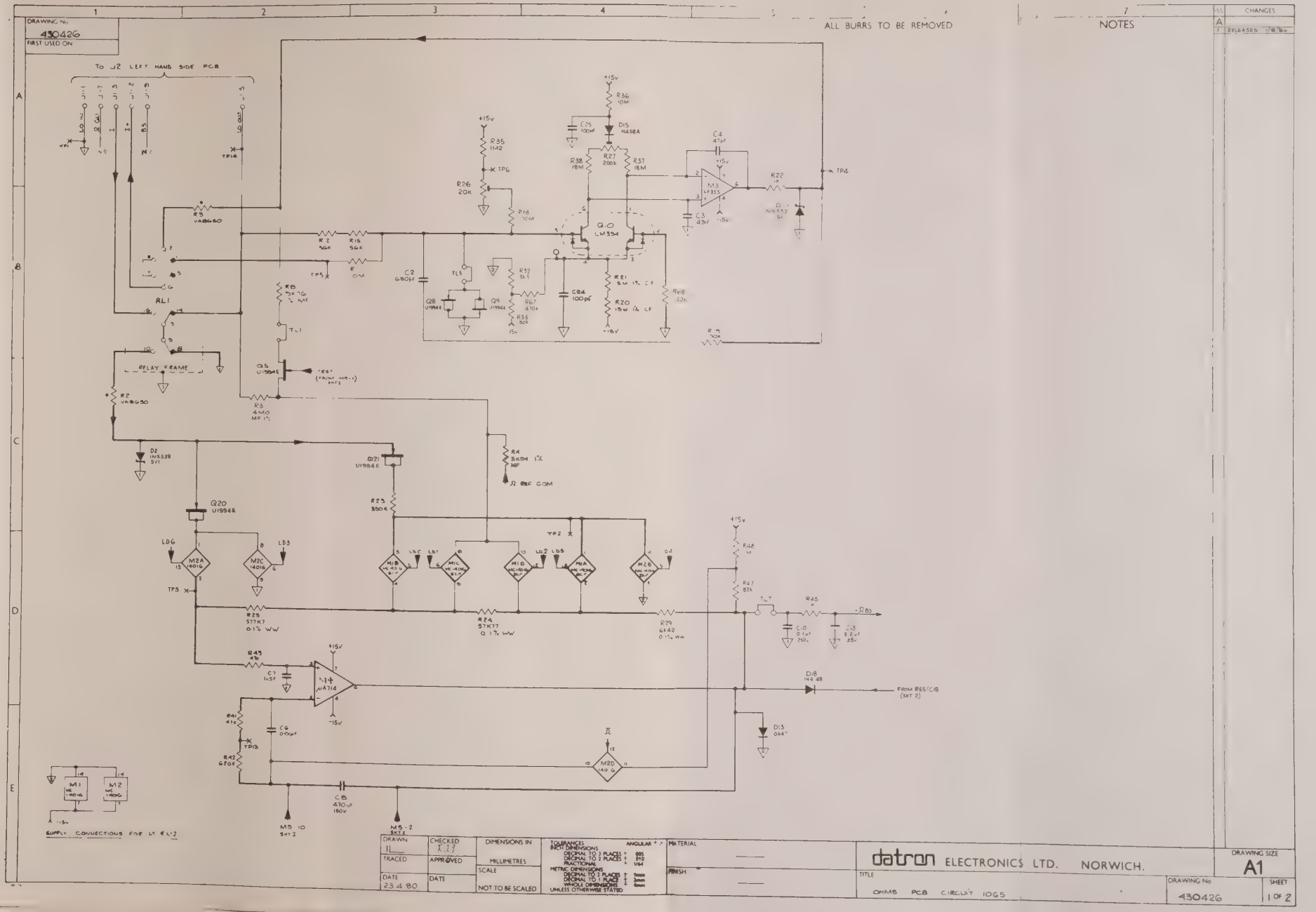
ALL SINGLE FET LEGS IN THE ORDER SHOWN

ALL TRANSISTOR LEGS IN THE ORDER SHOWN

DRAWN IL	CHECKED KJ	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± °	MATERIAL	datron ELECTRONICS LTD. NORWICH.
TRACED	APPROVED	SCALE 2:1	METRIC ± 0.1 TO 3 PLACES ± .005 ± 0.25 TO 2 PLACES ± .010 ± 0.5 DECIMAL ± 1/64 ± 1mm DIMENSIONS ± 0.5 TO 2 PLACES ± 1mm ± 1 TO 1 PLACE ± 2mm ± 2 DIMENSIONS ± 4mm UNLESS STATED	FINISH	TITLE 1065 OHMS PCB ASSY.
DATE 17 7 80	DATE	NOT TO BE SCALED			DRAWING No. 400426

DRAWING SIZE A1

SHEET 1 OF 12


DRAWING No
430426
FIRST USED ON
ALL BURRS TO BE REMOVED
NOTES
CHANGES
A
RELEASED 1/8/80
TO J2 LEFT HAND SIDE PCB
LO IN
SIG IN
I-
I+
BS
NC
LO OUT
TP14
+15v
R36 10M
C25 100nF
D15 N458A
R35 1M2
TP6
R26 20K
R38 18M
R27 200K
R37 18M
C4 47pF
M3 LF355
R22
TP4
C3 47nF
-15v
D1 IN5342 5v1
P18 10M
Q10 LM394
R2 56K
R15 56K
R5 VA8G50
TP5
R8 OM
C2 680pF
TL3
Q8 U1984E
Q9 U1984E
R32 5k1
R67 470R
R33 50R
15v
C84 100pF
RE1 5.1M 1% CF
R20 15M 1% CF
-15v
RV8 10k
RL1
RELAY FRAME
R9 7k76 1% MF
TL1
Q5 U1984E
TEST (FROM MA-1 SHT3)
R2 VA8G50
R3 4M10 MF 1%
D2 IN5338 5v1
Q21 U1984E
R4 3K04 1% MF
J2 RLF COM
Q20 U1984E
R23 330R
TP2
LD6
LD3
M2A 14016
M2C 14016
M1B MC14066
M1C MC14066
M1D MC14066
M1A MC14066
M2B MC14066
LD1C
LD1
LD2
LD5
C4
TP3
R25 517K7 0.1% WW
R24 57K77 0.1% WW
R29 6K42 0.1% WW
+15v
R48
R47 82k
TL7
R45
-R85
C10 0.1uF 250v
C13 2.2uF 35v
R43 47k
C7 15nF
M4 µA714
-15v
D18 IN4148
FROM R65/C18 (SHT 2)
R41 47k
C6 0.01uF
TP13
R42 6702
D13 OA47
M20 14016
C8 470nF 160v
M5-10 SHT2
M5-2 SHT2
M1 14016
M2 14016
-15v
SUPPLY CONNECTIONS FOR M1 & 2
DRAWN IL
CHECKED K.J.P
TRACED
APPROVED
DATE 23 4 80
DATE
DIMENSIONS IN MILLIMETRES
SCALE NOT TO BE SCALED
TOLERANCES
ANGULAR ± °
METRIC DIMENSIONS
UNLESS OTHERWISE STATED
MATERIAL
FINISH
datron ELECTRONICS LTD. NORWICH.
TITLE
OHMS PCB CIRCUIT 1065
DRAWING No 430426
DRAWING SIZE A1
SHEET 1 OF 2

DRAWING No. 430426
FIRST USED ON 1065

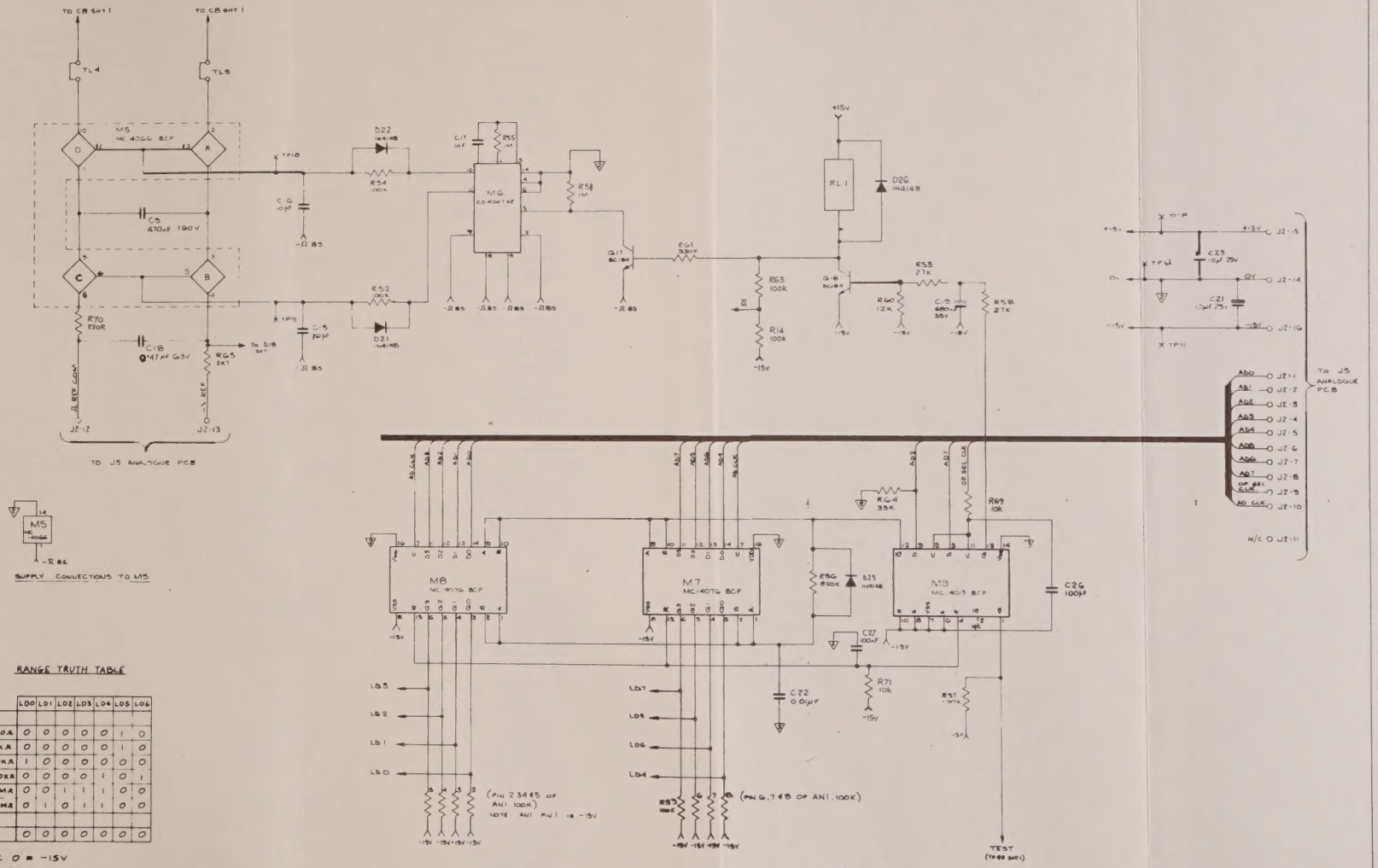
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS	CHANGES
A	
1	RELEASED 1.8.80



RANGE TRUTH TABLE

RANGE	LD0	LD1	LD2	LD3	LD4	LD5	LD6
100A	0	0	0	0	0	1	0
1KA	0	0	0	0	0	1	0
10KA	1	0	0	0	0	0	0
100KA	0	0	0	0	1	0	1
1MA	0	0	1	1	1	0	0
10MA	0	1	0	1	1	0	0
X	0	0	0	0	0	0	0

LOGIC 0 = -15V
LOGIC 1 = 0V
LOGIC 'X' = 'DONT CARE' CONDITION

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
IL	RJ	MILLIMETRES	INCH DIMENSIONS ANGULAR ± °	
TRACED	APPROVED	SCALE	DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	FINISH
DATE 24.6.80	DATE	NOT TO BE SCALED		

datron ELECTRONICS LTD. NORWICH.

TITLE: OHMS P.C.B CIRCUIT: 1065

DRAWING SIZE A1

DRAWING No. 430426

SHEET 2 OF 2

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